# REPORT RESUMES

ED 018 357 24 RE 001 194

THE EFFECTS OF SYSTEMATIC VARIATION OF SPEED AND DIRECTION OF OBJECT FLIGHT AND OF SKILL AND AGE CLASSIFICATIONS UPON VISUO-PERCEPTUAL JUDGMENTS OF MOVING OBJECTS IN THREE-DIMENSIONAL SPACE. FINAL REPORT.

BY- WILLIAMS, HARRIET G.
TOLEDO UNIV., OHIO

REPORT NUMBER BR-6-8102 PUB DATE JAN 68
GRANT OEG-3-7-068102-0486
EDRS PRICE MF-$1.00 HC-$9.56 237P.

DESCRIPTORS- *VISUAL PERCEPTION, *PERCEPTUAL MOTOR COORDINATION, *MALES, *SECONDARY SCHOOL STUDENTS, *COLLEGE STUDENTS, PERCEPTION TESTS, PSYCHOMOTOR SKILLS,

THIS STUDY WAS CONDUCTED TO INVESTIGATE THE EFFECTS OF VARIATIONS IN THE SPEED AND DIRECTION OF A FLYING OBJECT ON VISUO-PERCEPTUAL JUDGMENTS MADE, DIFFERENCES IN THE ABILITY OF SKILLED AND UNSKILLED SUBJECTS IN MAKING SUCH JUDGMENTS, AND THE EFFECTS OF AGE OR MATURITY LEVEL ON THE SPEED AND ACCURACY OF SUCH JUDGMENTS. THE SUBJECTS WERE 54 MALE JUNIOR HIGH, HIGH SCHOOL, AND COLLEGE STUDENTS CLASSIFIED AS SKILLED OR UNSKILLED DEPENDING ON EXPERIENCE IN BALL COMPETITIONS, PERFORMANCE ON A VELOCITY TEST, VISUAL ACUITY, AND DEPTH PERCEPTION CAPACITY. THEY WERE ASKED TO JUDGE VISUALLY THE FLIGHT OF A MOVING OBJECT BY CHOOSING AN "OPTIMUM POINT FOR INTERCEPTION" AND QUICKLY MOVING TO THE SELECTED SPOT. FIVE VARIABLES WERE CONSIDERED--(1) SPEED OF PROJECTION, (2) VERTICAL DIRECTION OF PROJECTION, (3) HORIZONTAL DIRECTION OF PROJECTION, (4) SKILL LEVEL, AND (5) AGE OR MATURITY LEVEL. MEASURES INCLUDED A REACTION TIME MEASURE, A MOVEMENT TIME INDEX, AND THREE MEASURES OF SPATIAL ACCURACY OF VISUO-PERCEPTUAL JUDGMENT. RESULTS SHOWED THAT THE SPEED AND ACCURACY WITH WHICH THE FLIGHT OF A MOVING OBJECT WAS JUDGED DEPENDED ON SPEED, THE HORIZONTAL DIRECTION, AND THE VERTICAL DIRECTION IN WHICH THE OBJECT WAS MOVING AT THE TIME OF JUDGMENT. HIGHLY SKILLED SUBJECTS WERE SUPERIOR TO UNSKILLED ONES IN MAKING VISUO-PERCEPTUAL JUDGMENTS. AGE HAD LITTLE OR NO EFFECT. TABLES AND CHARTS ARE INCLUDED. (AUTHOR/NS)

BR-6-8102
PA-24

URCHIN

ED018357

U. S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

FINAL REPORT
Project No. 6-8102 - 24
Grant No. OEG-3-7-068102-0486

# THE EFFECTS OF SYSTEMATIC VARIATION OF SPEED AND DIRECTION OF OBJECT FLIGHT AND OF SKILL AND AGE CLASSIFICATIONS UPON VISUO-PERCEPTUAL JUDGMENTS OF MOVING OBJECTS IN THREE-DIMENSIONAL SPACE

January 1968

RE001 194

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

FINAL REPORT
Project No. 6-8102
Grant No. OEG-3-7-068102-0486

# THE EFFECTS OF SYSTEMATIC VARIATION OF SPEED AND DIRECTION OF OBJECT FLIGHT AND OF SKILL AND AGE CLASSIFICATIONS UPON VISUO-PERCEPTUAL JUDGMENTS OF MOVING OBJECTS IN THREE-DIMENSIONAL SPACE

Harriet G. Williams

University of Toledo

Toledo, Ohio

January 1968

The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

# Summary

The purpose of the present study was threefold: (i) to assess the effects of systematic variation in velocity and direction of ball flight upon visuo-perceptual judgments made about moving objects in space; (ii) to determine whether or not highly-skilled and poorly-skilled performers differ in their ability to visually judge the flight of a moving object in three-dimensional space, and (iii) to assess the effect of age or maturity level of the individual upon the speed and accuracy of such visuo-perceptual judgments.

The experimental situation was as follows: a tennis ball was projected into the air from a Tennis Ball-Boy machine. The ball was interrupted in its flight by a canvas suspended four to five feet above the head of the subject. Subjects thus never came into actual physical contact with the moving object. The task of the subject was to visually judge the flight of this moving object, that is, to decide where the object was going in its flight, to select an 'optimum point for interception', and then to move as quickly as possible to that selected spot.

Five variables were selected for study. These included:

(a) Speed of Object Projection, used to assess the effects of velocity of ball flight upon judgments about moving objects in space;
(b) Vertical Angle of Object Projection, used to assess the effects of the vertical direction of object flight upon visuo-perceptual judgments about moving objects in space;
(c) Horizontal Angle of Object Projection, which served as a basis for evaluating the effects of horizontal direction of object flight upon visual judgments about the flight of moving objects;
(d) Skill Level, and
(e) Age or Maturity Level.

These latter two variables provided the bases for looking at differences in visuo-perceptual performances as a function of skill and/or age classification.

A total of fifty-four (54) subjects participated in the study. Eighteen subjects each were selected from a population of junior high, high school, and college age males. Of the eighteen subjects thus selected, nine were further classified as skilled, nine as unskilled. The criteria for skill classification were: (a) the number of years of participation in organized baseball competition, including varsity and/or Little League membership and (b) the position held by the individual in a distribution of scores based upon performances on an Overarm Throw for Velocity test. Subjects were also screened for minimum visual acuity and depth perception capacity.

Measures of the visuo-perceptual judgment included a reaction time measure, a movement time index, and three measures of the spatial accuracy of the visuo-perceptual judgment. The data were analyzed by means of five separate univariate analyses of variance, each using a single performance index per analysis. Where appropriate, Scheffe's Multiple Comparisons Test was used to compare differences between group means.

Results were as follows:

(1) The speed and accuracy with which the flight of a moving object was judged was, to a large extent, dependent upon the specific set of visual cues involved, that is, upon the particular speed, horizontal and/or vertical direction in which the object was moving at the time it was being judged. This of course suggests that if we are to enhance the degree of success experienced by the individual in learning and/or performing certain gross motor skills, we need to begin to identify more specifically the kinds of visual cues involved in the performance of motor skills and to evaluate them in terms of the kinds of demands which they place upon the sensori-perceptual apparatus of the individual.

(2) Individuals classified as highly-skilled were significantly superior to individuals classified as poorly-skilled in visually judging the flight of a moving object in space. Such findings tend to support the notion that the highly-skilled performer may, in fact, possess a sensori-perceptual mechanism that is superior to that of the unskilled performer. If such differences in the visuo-perceptual capacities of the hihgly-skilled and the poorly-skilled sports performer do exist, it is important that we begin to establish whether or not such differences are innate ones or if the 'potentially' unskilled individual can be trained to use his visuo-perceptual apparatus more effectively through properly planned and appropriately timed perceptual-motor experiences.

(3) Age, as represented by a sample of junior high, high school and college age males, had little or no effect upon the speed and accuracy with which the individual judged the flight of a moving object in three-dimensional space. In a recent study concerned with the development of visual perception in the young child, Williams (109) reported that visuo-perceptual abilities involved in judging the flight of a moving object in space appeared to be functionally mature at about eleven years of age. Since the average age of the youngest group studied in the present investigation was twelve, this may account for the fact that no significant age differences were found.

## TABLE OF CONTENTS

CHAPTER PAGE

I. INTRODUCTION . . . . . . . . . . . . . . . . . . . . . . . . . 1

II. REVIEW OF LITERATURE . . . . . . . . . . . . . . . . . . . . 4
  Visual Perception . . . . . . . . . . . . . . . . . . . . . . 4
  Visual Perception and Motor Behavior . . . . . . . . . . . 4
  Perception of Movement . . . . . . . . . . . . . . . . . . . 9
  Perception of Speed of Movement . . . . . . . . . . . . . . 10
  Perception of Direction of Movement . . . . . . . . . . . 12
  Motion Prediction . . . . . . . . . . . . . . . . . . . . . 13
  Other Factors Affecting Visuo-Perceptual Performance . . 15
  Visuo-Perceptual Capacities of the Skilled and Unskilled 18
    Depth perception . . . . . . . . . . . . . . . . . . . . 18
    Peripheral vision and visual acuity . . . . . . . . . . 19
    Other visuo-perceptual capacities . . . . . . . . . . . 20
  Age and Visuo-Perceptual Capacities . . . . . . . . . . . 21
    Depth perception . . . . . . . . . . . . . . . . . . . . 21
    Spatial directions . . . . . . . . . . . . . . . . . . . 22
    Perception of movement . . . . . . . . . . . . . . . . . 22
    Other perceptual capacities . . . . . . . . . . . . . . 24
  Summary . . . . . . . . . . . . . . . . . . . . . . . . . . 25

III. STATEMENT OF THE PROBLEM . . . . . . . . . . . . . . . . . 27

IV. PROCEDURES . . . . . . . . . . . . . . . . . . . . . . . . . 29
  The Task . . . . . . . . . . . . . . . . . . . . . . . . . . 29
  The General Experimental Schema . . . . . . . . . . . . . 31
  The Variables . . . . . . . . . . . . . . . . . . . . . . . 33
    Selection of levels of speed, vertical and horizontal direction . . . . . . . . . . . . . . . . . 34
    Estimation of the values of speed and vertical angle variables . . . . . . . . . . . . . . . . . . . 38
    Consistency of object projection . . . . . . . . . . . 39
  Measures of the Visuo-Perceptual Performance . . . . . . 44
    Optimum area of interception . . . . . . . . . . . . . 45
    Experimental evaluation of the dimensions of the 'optimum area of interception' . . . . . . . . . . . 48
    Measures of the spatial judgment . . . . . . . . . . . 52
    Determination of the subject's selected point of interception . . . . . . . . . . . . . . . . . . . . 54
    Reliability of the performance measures . . . . . . . 58
  Selection of Subjects . . . . . . . . . . . . . . . . . . . 61
    General procedures . . . . . . . . . . . . . . . . . . . 61
    Criterion for visual acuity and depth perception performance . . . . . . . . . . . . . . . . . . . . . 64
    Final selection of subjects . . . . . . . . . . . . . . 64
  Collection of the Data . . . . . . . . . . . . . . . . . . 65
    Analysis of the data . . . . . . . . . . . . . . . . . . 66

V. RESULTS . . . . . . . . . . . . . . . . . . . . . . . . . . . 68
  Selection of the Level of Significance . . . . . . . . . . 68

CHAPTER PAGE

Reliability of the Performance Measures . . . . . . . . . . . 69
Speed of the Perceptual Judgment. . . . . . . . . . . . . . . 69
  Group characteristics . . . . . . . . . . . . . . . . . 70
  Stimulus characteristics of the moving object . . . . . 72
Accuracy of the Visuo-Perceptual Judgment . . . . . . . . . 74
  Distance deviation. . . . . . . . . . . . . . . . . . . 74
  Radial error. . . . . . . . . . . . . . . . . . . . . . 84
  Lateral deviation . . . . . . . . . . . . . . . . . . . 92
Movement Time . . . . . . . . . . . . . . . . . . . . . . . 100
  Group characteristics . . . . . . . . . . . . . . . . . 100
  Stimulus characteristics of the moving object . . . . . 103
Summary . . . . . . . . . . . . . . . . . . . . . . . . . . 106

VI.. SUMMARY, DISCUSSION, CONCLUSIONS . . . . . . . . . . . . 111
Summary . . . . . . . . . . . . . . . . . . . . . . . . . . 111
Discussion . . . . . . . . . . . . . . . . . . . . . . . . 112
Conclusions . . . . . . . . . . . . . . . . . . . . . . . . 121
Suggestions for Further Study . . . . . . . . . . . . . . . 122

BIBLIOGRAPHY . . . . . . . . . . . . . . . . . . . . . . . . . 124

APPENDICES . . . . . . . . . . . . . . . . . . . . . . . . . . 131
Appendix A . . . . . . . . . . . . . . . . . . . . . . . . . 131
  Subject Instruction . . . . . . . . . . . . . . . . . . . 131
  Lafayette Depth Perception Apparatus . . . . . . . . . . . 133
  Overarm Throw for Velocity Test . . . . . . . . . . . . . 134
  Distribution of Mean of Four Trials on the Overarm Throw for Velocity Test . . . . . . . . . . . . . . . . . . . 136
  Information Sheet . . . . . . . . . . . . . . . . . . . . 137
  Characteristics of Selected Subjects . . . . . . . . . . . 138
Appendix B . . . . . . . . . . . . . . . . . . . . . . . . . 140
  Order of Presentation of Experimental Conditions . . . . . 140
  Raw Scores . . . . . . . . . . . . . . . . . . . . . . . . 155
    Reaction time . . . . . . . . . . . . . . . . . . . . . 155
    Movement time . . . . . . . . . . . . . . . . . . . . . 169
    Deviation scores--distance . . . . . . . . . . . . . . 183
    Deviation scores--radial . . . . . . . . . . . . . . . 197
    Deviation scores--lateral . . . . . . . . . . . . . . . 211
  Results of Scheffe's Multiple Comparison Tests. . . . . . . 225

## LIST OF TABLES

TABLE PAGE

1. Description of the Experimental Variables . . . . . . . . . 33
2. Horizontal Angles of Projection: Distance in Feet Right or Left of Subject's Starting Point to Optimum Point of Interception . . . . . . . . . . . . . . . . . . . . . 37
3. Characteristics of Object Trajectories . . . . . . . . . . 39
4. Summary Table: Means, Standard Deviation and Range of the Distribution of Landing Points of 50 Object Projections (in inches) . . . . . . . . . . . . . . . . . . 44
5. Number and Per Cent of 60 Balls Landing in Outlined 'Optimum Areas of Interception' . . . . . . . . . . . . 49
6. Pilot Investigation I: Number and Per Cent of 60 Balls Caught within 'Optimum Area of Interception'. . . . . . 50
7. Pilot Investigation II: Number of Balls 'Successfully' Caught within the One and Two Foot Boundary Areas . . . 51
8. Reliability Estimates and Number of Trials Required to Obtain a Projected Reliability of .80 . . . . . . . . . 59
9. Projected Reliabilities with a Maximum of Eight Trials Per Condition . . . . . . . . . . . . . . . . . . . . . 60
10. Analysis of Variance: Depth Perception Performance by Age and Skill . . . . . . . . . . . . . . . . . . . . . 65
11. Reliability of Performance Measures . . . . . . . . . . . 70
12. Summary Table: Analysis of Variance--Reaction Time . . . 71
13. Speed of Perceptual Judgment: Comparison of Means (Reaction Time) . . . . . . . . . . . . . . . . . . . . 74
14. Summary Table: Analysis of Variance--Distance Deviation. 75
15. Spatial Accuracy of the Visuo-Perceptual Judgment: Comparison of Means (Distance Deviation). . . . . . . . 79
16. Spatial Accuracy of the Visuo-Perceptual Judgment: Comparison of Means (Distance Deviation Cont'd) . . . . 82
17. Summary Table: Analysis of Variance--Radial Error . . . 85
18. Spatial Accuracy of the Visuo-Perceptual Judgment: Comparison of Means (Radial Error) . . . . . . . . . . . 89
19. Summary Table: Analysis of Variance--Lateral Deviation . 93
20. Spatial Accuracy of the Visuo-Perceptual Judgment: Comparison of Means (Lateral Deviation) . . . . . . . 101
21. Summary Table: Analysis of Variance--Movement Time . . . 102
22. Movement Times: Comparison of Means . . . . . . . . . . 106

## LIST OF ILLUSTRATIONS

FIGURE PAGE

1. General Experimental Set-Up . . . . . . . . . . . . . . . . . 30
2. Distribution of Landing Points of 50 Object Projections: Fast-High Condition . . . . . . . . . . . . . . . . . . . 40
3. Distribution of Landing Points of 50 Object Projections: Fast-Low Condition . . . . . . . . . . . . . . . . . . . 41
4. Distribution of Landing Points of 50 Object Projections: Slow-High Condition . . . . . . . . . . . . . . . . . . . 42
5. Distribution of Landing Points of 50 Object Projections: Slow-Low Condition . . . . . . . . . . . . . . . . . . . 43
6. Pilot Investigation II: Boundary Lines Added to 'Optimum Areas of Interception' . . . . . . . . . . . . . 51
7. Schematic Representation of the Size and Location of the Twelve 'Optimum Areas of Interception' . . . . . . . 53
8. Diagramatic Representation of the Measures of the Spatial Judgment. . . . . . . . . . . . . . . . . . . . . 54
9. Method Used to Assess Spatial Position Assumed by Subject's When Judging Moving Objects . . . . . . . . . . 55
10. Method Used to Measure Spatial Judgments of Subjects . . . 56
11. Method Used to Measure Spatial Judgments of Subjects (Cont'd) 57
12. Speed of the Visuo-Perceptual Responses According to Group and Stimulus Characteristics (Reaction Time) . . . 73
13. Accuracy of the Visuo-Perceptual Judgments According to Group and Stimulus Characteristics: Distance Deviation 77
14. Interaction Effect: Age X Speed X Vertical Direction (Distance Deviation in Inches) . . . . . . . . . . . . . 78
15. Interaction Effect: Horizontal X Vertical Direction (Distance Deviation in Inches) . . . . . . . . . . . . . 79
16. Interaction Effect: Speed X Vertical Direction (Distance Deviation in Inches) . . . . . . . . . . . . . 81
17. Interaction Effect: Speed X Horizontal Direction (Distance Deviation in Inches) . . . . . . . . . . . . . 81
18. Interaction Effect: Skill X Speed X Vertical Direction (Distance Deviation in Inches) . . . . . . . . . . . . . 83
19. Accuracy of Visuo-Perceptual Judgments as a Function of Group Characteristics and Stimulus Attributes of the Moving Object in Space (Radial Error) . . . . . . 87

FIGURE PAGE

20. Interaction Effect: Vertical X Horizontal Direction (Radial Error in Inches) . . . . . . . . . . . . . . . . . 88

21. Interaction Effect: Speed X Horizontal Direction (Radial Error in Inches) . . . . . . . . . . . . . . . . . 90

22. Interaction Effect: Speed X Vertical Direction (Radial Error in Inches) . . . . . . . . . . . . . . . . . 90

23. Interaction Effect: Speed X Skill X Vertical Direction (Radial Error in Inches) . . . . . . . . . . . . . . . . . 91

24. Accuracy of the Visuo-Perceptual Judgment According to Group and Stimulus Characteristics (Lateral Deviation) 94

25. Interaction Effect: Age X Horizontal Direction (Lateral Deviation in Inches). . . . . . . . . . . . . . . 95

26. Interaction Effect: Age X Speed X Horizontal Direction (Lateral Deviation in Inches) . . . . . . . . . . . . . . 96

27. Interaction Effect: Speed X Horizontal Direction (Lateral Deviation in Inches) . . . . . . . . . . . . . . 97

28. Interaction Effect: Speed X Vertical Direction (Lateral Deviation in Inches) . . . . . . . . . . . . . . 97

29. Interaction Effect: Horizontal X Vertical Direction (Lateral Deviation in Inches) . . . . . . . . . . . . . . 98

30. Interaction Effect: Speed X Horizontal X Vertical Direction (Lateral Deviation in Inches) . . . . . . . . . . . . . . 99

31. Movement Time as a Function of Group and Stimulus Characteristics . . . . . . . . . . . . . . . . . . . . . 104

32. Interaction Effect: Speed X Vertical Direction (Movement Time) . . . . . . . . . . . . . . . . . . . . . 105

# CHAPTER I

## INTRODUCTION

> All men by nature desire to know. An indication of this is the delight we take in our senses; for even apart from their usefulness they are loved for themselves; and above all others the sense of sight. . . . .the reason is that this, most of all the senses, makes us know and brings to light many differences between things (30, p.13).

That vision and/or visual perception are inexticably linked with the total action system of the organism is seen in the fact that it is through the functioning of the visual mechanism that much of the adaptive behavior of the organism is accomplished. For example, the Drosophila or fruit fly, through its visual faculties, is normally able to detect movement in its external environment. It is not unusual, however, for visuo-perceptual abnormalities to occur in these flies and when this happens, the visually abnormal fly is unable to detect movement in its environment (61). As a result, the fly soon falls victim to the 'unperceived' movements of other organisms. Vision, in this case, plays an important role in the survival of the organism.

The visual mechanism tends to assume an equally important role in the normal functioning of organisms higher up on the evolutionary scale and, in man, becomes an integral part of the whole of his behavior. In fact, it seems that Gesell may not have been far from correct when he suggested that "no one of the major fields of (man's) behavior - motor, adaptive, language, and personal-social - is normally devoid of its visual content or control." (30, p.214)

Theoretically, the importance of visual perception in gross motor performance has not been overlooked. In an article which appeared in the College Physical Education Association Proceedings, Hubbard (54, p.59) wrote:

> Sports skills are not exclusively motor. . . . (they) require special ability in analyzing and interpreting visual cues or refined visual perception.

Consider a sports situation in which the individual is required to manipulate and/or move his body in relation to a moving object in space. Successful adaptation to such a situation might be visualized, schematically, as providing answers to two main questions:

> (a) Where is the object going, that is, how fast is it moving and in what direction, and
>
> (b) How must I, the performer, move to successfully interact with this object, that is, to catch it or strike it or kick it?

The first problem is obviously a visuo-perceptual one, the second, a motor problem. A completely adaptive motor response in this situation would then require a precise visuo-perceptual judgment on the part of the performer. In other words, to perform successfully, the individual must make an accurate judgment about the characteristics of the present stimulus situation. In addition, since there is, in most sports situations, little if any time available to 'rejudge' the stimulus, this initial judgment or interpretation must be both rapid and precise if the performance is to be successful.

If the initial task facing the performer in many sports situations is a visuo-perceptual judgment, then the key to understanding some of the important facets of gross motor performance may well lie in the visuo-perceptual events which precede the actual movement or motor behavior of the individual. At present we know little if anything about the nature or role of such visuo-perceptual events in skilled motor performance. Hubbard (54, p. 66) has noted that:

> The nature of the perceptual problems in sports has received little study. . . .Such research is as important as understanding the physical-mechanical problems of sports or developing a sound experimental kinesiology. Such research should help us to understand what we mean by 'athletic skill' and ultimately help us to develop skill more adequately.

It is toward a more thorough understanding of the nature and role of visuo-perceptual processes in skilled gross motor performance that the present investigation was directed.

# CHAPTER II

# REVIEW OF THE LITERATURE

The review of related literature has been divided into the following sections: (a) Visual Perception, (b) Visual Perception and Motor Performance, (c) Perception of Movement, (d) Perception of Speed of Movement, (e) Perception of Direction of Movement, (f) Motion Prediction, (g) Other Factors Affecting Visuo-Perceptual Performances, (h) Visuo-Perceptual Capacities of the Skilled and Unskilled, and (i) Age and Visuo-Perceptual Capacities.

**VISUAL PERCEPTION.** Perception may perhaps best be described as a series of sequentially ordered sensory events beginning with an object or event in the periphery and ending with an event in the brain of the individual (34,42,43,45,75,92,102,107,114). Visual perception begins then with the receiving of certain stimulus information from the external environment in the form of light rays falling upon the retina of the eye. These light rays are translated by means of complex chemical processes into a pattern or series of patterns of nerve impulses which are ultimately transmitted via complex nerve pathways to the visual sensory area in the cerebral cortex. Concomitantly with the transmission and arrival of this pattern of nerve activity in the cerebral cortex, the past experience of the individual is believed in some way to be integrated with the present pattern of stimulation. Perception then occurs as a result of a number of complex neural events occuring somewhere in the higher regions of the brain (12).

**VISUAL PERCEPTION AND MOTOR BEHAVIOR.** The study of perception and the study of overt motor behavior have, more often than not, proceeded independently of one another. Even though some of the early work of psychologists suggested that perception and movement might, in fact, be inextricably interrelated in the production of overt motor behavior, it has not been until recent years that such phenomena have gained the attention of scientists and scholars. Many psychologists, educators, and physical educators now assert that perception and movement are but variations of a single mechanism, a mechanism which, in essence, allows man to direct and/or modify his movement in 'accordance with variations in stimulus patterns' in his external environment (22,54,91, 92).

Recent research concerned with the interrelationship of perception and movement has, indeed, supported the notion that overt motor performance is, in the final analysis, a complex combination of both perceptual and motor events (8,10,18,30,47,70,92,93). That visuo-perceptual and motor information need be coordinated in a precise manner to produce effective motor behavior is clearly seen in the results of numerous studies of distortion of visual feedback (47,92,93). These studies have shown, without exception, that when visual information related to an overt motor act is spatially or temporally distorted, the associated motor performance deteriorates markedly. It appears that only by actively moving the body and/or body parts within the context of this displaced visual environment can effective behavioral adaptation occur. Held (50,51,52), for example, found that behavioral adjustments to rearranged visual fields significantly improved when the individual was permitted to voluntarily initiate movement within this new environment. Hoepner (53) and other (92,115) have reported similar findings. After extensive investigation of this phenomenon, Held concluded that the same mechanism was probably involved in the individual's adaptation to a rearranged visual field as was involved in the original acquisition of spatial behaviors by the child and that, in either case, movement with its concurrent visual feedback was a vital ingredient in the development of spatially coordinated behavior.

Studies involving both lower organisms and humans who were deprived of vision or visual information for varying periods of their lives also support the idea that visuo-perceptual information must, in some way, be coordinated with motor activity in order for normally coordinated spatial behaviors to develop (68,70,87,88,103,110). Reisen (88) has shown, for example, that in chimpanzees reared in the dark, the ability to coordinate movements with spatially perceived objects was completely lacking and built up slowly only after the animal was put into a natural environment. That is, the animal began to behave 'normally' only after he had had opportunity to coordinate visual and motor experiences.

Similarly, Wilson (110) reported that monkeys, neonatally deprived of patterned light, were much like the newborn infant monkey in that many visual and visuo-motor behaviors were lacking in these animals. In other words, there seemed to be a close similarity, behaviorally, between the newborn monkey and the newly seeing monkey. When the visually deprived monkeys were exposed to patterned light, visuo-motor behaviors of various kinds began to appear and in much the same manner as in the young infant monkey. Von Senden (103) has reported a similar lack in the development of spatially-oriented visuo-motor behaviors in congenitally blind humans after vision was restored by surgery. Simple geometric figures which were readily recognized by touch could not, for example, be recognized as easily (as is generally the case with the normally-seeing individual) through vision alone.

In a slightly different approach, Kurke (68) compared the behavior of chicks who received a regular regimen of motor activity during the first ten days of their lives with that of a comparable group of chicks who did not receive such motor experience. Results showed that the depth perception of the chicks who had had motor experience was significantly superior to that of chicks who had not had such experience. This suggests that certain visuo-perceptual capacities may be, to some degree, dependent upon motor experience.

A similar kind of phenomenon has been suggest by Gibson (34, p. 225) as a result of his work with vision and movement. He states that "retinal stimulation is actively linked to bodily action from birth onward. . . ." and that for "every seeing individual there is a co-variation of retinal stimulation and muscular-tactile stimulation" which vary together in a continuous and unique way until they ultimately become associated with a specific set of motor or behavioral reactions. Gibson (34) thus also supports the general belief that an integral part of the development and refinement of overt behavior is the coordinating of visual and motor experiences. Regardless of how it is approached, available evidence leaves little doubt that vision and/or visual perception assume important roles in refined motor behavior.

Physical educators have not infrequently alluded to the presence and perhaps important role of visuo-perceptual events in gross motor performances. Nearly twenty years ago, for example, McCloy (72, p. 34) cited "the judgment of the relationship of the subject to external objects" as an important factor in motor educability. More recently Kretchmar (67, p.241) has written that "it is only through the ability of the body to translate visual cues into muscular language that things become guides to action." Other physical educators (22,54) have suggested that there may, in fact, exist a visuo-perceptual continuum along which various motor performances may be distributed.

Direct evidence of the role of visual perception in the performance of motor skills is seen in the work of Fleischman and Hempel (25) who found that the factors which dominate the early learning and performance of a complex psychomotor skill were, in fact, visuo-perceptual in nature. That is, the dominant factors in early learning were those concerned with visualization or interpretation of various aspects of the visuo-spatial environment. The factors most important in later stages of learning and performance were, on the other hand, predominantly motor in nature.

Other factor analytic studies have also indicated that certain visuo-spatial factors may be important in the performance of various motor skills (1,24). Ayres (1), for example, studying the perceptual-motor behavior of children identified two main factors which were common to the nineteen motor tasks involved in the investigation. One was a general perceptual-motor ability factor dominated by tactile and kinesthetic elements, and the other a visuo-perceptual factor strongly loaded with tasks more purely visual in nature.

Fleischman (26), in a study of skilled psychomotor performance, identified nine factors common to perceptual-motor performances. Four of these nine factors involved visuo-perceptual capacities. These factors included:

(a) a factor called perceptual speed, or the ability to make rapid comparisons of visual forms and to note similarities and differences in form and detail,

(b) a factor called visualization, or the ability to mentally manipulate visual images of objects, and,

(c) two factors called spatial relations I and II, the first involving the ability to interpret spatial characteristics of the stimulus situation and the second the ability to discriminate direction and to orient movement patterns accordingly.

The remaining five factors were ones characterized by tasks which were predominantly motor in nature.

Studies relating to gross motor performances are not as plentiful as those involving fine motor skills. In one study involving the learning of selected gross motor skills, Stallings (95) found that individuals who scored high on certain aspects of a 'visuo-spatial abilities test' displayed significantly superior performances in the early stages of the learning of these gross motor skills than did individuals who scored low on the same test. Sherman (91), has also reported that football players were able, with only brief exposures to the stimulus field, to develop a high degree of accuracy in using external visual cues to direct subsequent passing performance. Graybiel (44) reported that when athletes were deprived of peripheral visual cues, certain highly refined motor performances, including the javelin and discus throws deteriorated to a marked degree. The movements of athletes performing such skills were clumsy and the distances covered by the throws significantly shorter. This suggests that certain peripheral visual cues may be important in the performance of certain gross motor skills.

Hubbard and Senge (55) studied visual movements of batters via motion picture analysis and reported that pursuit movements of the eyes appeared to be the primary basis for tracking the oncoming ball. These authors suggest that batting is thus more a visuo-perceptual problem than a motor or reaction time problem. Although such studies as these are few in number, they do in general suggest that visual perception is an important component of gross motor performance.

PERCEPTION OF MOVEMENT. In the classic investigation on the thresholds of visual movement, Brown (14) reported that the threshold for just discriminable movement occurred when objects moved at speeds ranging from 0.11 to 0.30 cm/second. This rate of movement is proportional to approximately 2 to 6 minutes of the arc per second. The exact rate of speed required for the perception of movement to occur was, in this case, dependent upon the size of the visual field in which in was viewed. Brown and Conklin (15), in a later study, used rates of movement varying from 1.61 feet/second to 27.37 feet/second and found that although the threshold for movement varied as a curvilinear function of both speed of movement and exposure time, thresholds were generally lower for faster rates of movement.

Results of a study by Gottsdanker (39) indicated that the threshold for the perception of movement could be greatly reduced by placing certain visual cues in the environment in which the movement was observed. Thresholds for the perception of peripheral movement, although affected by the same general phenomena, are usually higher than those of central or foveal vision (42). These studies would suggest then that no exact or unchanging value for the threshold of the perception of movement can be stated for such a threshold is affected by a variety of factors including the size of the visual field, the speed of the movement, and the nature of the background against which movement is observed. It is obvious, however, that only minimal amounts of displacement of an object are necessary for an individual to perceive that movement is occurring.

PERCEPTION OF SPEED OF MOVEMENT. Several studies have looked at the thresholds for perceiving differences in the rate or speed of movement of an object, or difference thresholds (41,80,104). Notterman et al (80) studied the difference limen for velocity and found that Weber's Law, $DL = \frac{\Delta V}{V}$ held true for only a very small portion of the total range of velocities used in the study. The Weber Fraction, an indication of the sensitivity to changes in velocity, was quite small for very slow angular velocities, indicating that only small increments in velocity were required before the individual perceived a change in the rate of movement. At higher speeds the fraction became quite large. Thus, larger increments in velocity were necessary before individuals could perceive a change in the rate of object movement at faster rates of speed. Gottsdanker et al (41) found that for the individual to perceive a change in velocity of an object, presently moving at a constant rate, there had to be at least a 40 to 50% increase in the speed of movement of that object. He concluded that this may represent a general insensitivity on the part of the individual to gradual changes in acceleration. This is, of course, different from the perception of instantaneous changes in speed of movement for which thresholds are very low.

The perception of velocity of a moving object may be affected by any number of factors which may be present in the stimulus situation. Goldstein (36) found that visual judgments of the velocity of a moving stimulus were affected by the amount of time the moving object was viewed. The speed of movement of the stimulus was perceived to be slower when subjects were permitted to view the object for moderately long periods of time. The most accurate judgments of velocity were made, strangely enough, when the viewing time was relatively short. It has also been reported that prior exposures to a moving stimulus pattern may affect the velocity at which stimuli presented subsequently are perceived to be moving. Carlson (17), for example, found that prior exposure to other movement tended to cause the perceived velocity of a moving light to be significantly reduced, that is, the object was perceived to be moving more slowly that it normally would be.

The perception of velocity or speed of movement is also affected by the visual context in which it is observed. Johansson (57) reported that when two objects were moving simultaneously, individuals tended to experience what he called a 'velocity synthesis'. What occurred in this 'velocity synthesis' may be described as follows. A single spot of light moving at the same rate of speed as a second group of two spots was perceived to be moving half as fast as the two spots of light. In other words for all three of the dots to be perceived as moving equally fast, the single spot had to be moving twice as fast as the group of two dots.

Gemelli (28) reported an interesting phenomenon in a study of the visual perception of movement. When subjects in this study were asked to judge the speed of two different categories of objects: (a) those normally associated with movement of some kind (airplanes) and (b) those not generally associated with movement (geometric figures), the airplanes were always perceived or judged as moving faster than the simple geometrical forms. Gemelli (28) suggested that the individual uses his prior knowledge about an object and its movement in making his judgment about the present speed of movement of that object. No studies could be found which dealt with the perception of the velocity of moving objects in three-dimensional space.

PERCEPTION OF DIRECTION OF MOVEMENT. No studies were available which dealt solely with the perception of direction of movement. Most work has been concerned with the interdependency of both speed and direction of movement upon judgments made about a moving object in space. Results of one study which involved judgments about a moving disk did indicate that direction of movement tended to be perceived with greater accuracy than did speed of movement. Gemelli (28) has also reported that if the third dimension is added, perception of direction is 'quick and evident'.

Gemelli (28) noted in his study of the moving disk that the direction of movement of the disk significantly affected the precision with which the speed of movement was assessed. For instance, movement in a downward direction, either perpendicular or slanting, was judged as being more rapid than movement in either an upward or a horizontal direction. In terms of movement in a horizontal direction, at slower speeds, objects moving from left to right were in general judged as moving faster than objects moving from right to left. This directional effect, however, seemed to be erased at higher speeds. Other investigators (37,101) have reported no significant effects due to the horizontal direction of movement upon judgments of the speed of a moving object. Van Waters (101) suggested that the effect of horizontal direction of movement upon judgments of velocity was a matter of individual differences. For example, in his study some individuals were more accurate when asked to judge a light moving from right to left while others were more accurate in their judgments when the light moved from left to right.

Another study (13) dealing with the angle of approach of the stimulus object, reported that the closer the angle of approach of the object to the line of sight of the observer, the greater the extent of movement required by the individual to make a correct judgment concerning the movement occurring. When there was zero degrees lateral displacement, the observer was unable to make an accurate judgment of the movement at all.

MOTION PREDICTION. A number of studies have been concerned with the effect of target velocity upon a phenomenon referred to as motion prediction (29, 38,40,108). Motion prediction is defined by Weiner (108, p. ) as "an extrapolation to a future position (of an object) from current information." In other words, in these situations, the individual is asked to make certain judgments or predictions about the future position of an object based on a brief or momentary exposure to the moving object. Gibson (33) used the 'Estimation of Velocity Test' to study motion prediction. In this study, the subjects observed a motion picture of an aircraft flying into a cloud followed by a shell burst on the screen. Subjects were asked to report whether the shell had burst behind or ahead of the aircraft which was no longer visible. Results revealed that most subjects were quite accurate in their judgments and could detect a deviation of as little as one inch. Gerhard (29), in reviewing this study, has suggested however that due to the limited number of alternative responses available to the subject, this may be somewhat misleading as an indication of the everyday ability to judge velocity.

In general, available evidence suggests that the accuracy of predictions about a moving target may be directly related to the speed of movement of that target (29,40,108). Gerhard (29) reported that faster speeds were more difficult to judge in predicting movement than were slower speeds.. The task of the subject in this study was to adjust the speed of a 'horizontally' moving light to match that of a light moving vertically downward so that both lights reached a specified point in space at the same time. The display panel for these two lights was partitioned into six sections and was so arranged that the path of the vertical light could be obscured for as much as one-half of the length of its path. Results indicated that under these conditions faster speeds were more difficult to judge than were slower speeds. Gottsdanker (38), in another study of motion prediction, found that although the prediction of the path of a moving object tended to be more accurate at fast speeds, it was not significantly better than at slower speeds.

Two studies reported, however, (40,108) that as the speed of movement increased, the accuracy of motion prediction also increased. That is, the individual was able to predict the end point of an object's movement more precisely if the object were moving at faster rates of speed. Gemelli (28) has suggested that there are some individuals who simply cannot estimate velocity accurately and that these individuals will regardless of the situation, tend to make large errors when judging the speed of movement of an object.

In an attempt to determine what other factors might affect motion prediction, Gerhard (29) blocked out various portions of the visual field, ranging from 20% to 80%, in which moving objects were viewed. Results indicated that blocking out as much as 80% of the visual field had little or no effect upon the accuracy of the motion prediction performance. In fact, initial quick judgments were with regard to estimating the speed of movement of an object, the most accurate. It is interesting to note that in the study by Gerhard (29), a fairly orderly sequence of events seemed to occur in these motion prediction performances. First, the subject judged the speed of the vertical light and adjusted the speed of the horizontal light accordingly. He then made no further adjustments until the vertical light reappeared at which time only small final adjustments were made in the speed of the horizontal light. This suggests that the individual may make an initial gross judgment of the speed of the moving object and then, if necessary, make smaller or finer adjustments at a point later in time. This would not seem to be too far afield from the kind of thing which might logically occur in a three-dimensional sports situation.

OTHER FACTORS AFFECTING VISUO-PERCEPTUAL PERFORMANCE. Evidence indicates that if the series of events leading to 'perception' is interrupted at any stage between its point of origin in the periphery and its end point in the cerebral cortex, perception as we normally think of it does not occur (10, 12, 79). It has been shown experimentally that a number of factors may affect the intricate processes underlying visual perception. In fact, interpretation or perception of a particular stimulus situation may vary markedly according to the number, nature and arrangement of the elements or events making-up the total stimulus complex(2,3,21,27,35,59,60,69,71,82,97,106).

Evidence suggests, for example, that the background or context in which stimulus objects or events are viewed may affect visuo-perceptual judgments of a given stimulus situation. French (27) studied the effect of a background of visual noise on the recognition of certain visual target patterns and found that increasing the amount of target noise (confused visual background) produced a steady decrement in the ability of the individual to visually identify various target patterns. Thresholds for perceiving curvature in a line have also been reported to change as a result of the visual context in which they are viewed (97). In a slightly different vein, Gogel (35) investigated the perception of the relative distance of objects in the visual field and indicated that such perceptual judgments may be readily influenced by the presence of other distorted objects in the visual field of the observer. This of course suggests that subtle changes in the background or content of the visual field may bring about considerable variation in visuo-perceptual judgments.

Several studies have reported that changing the spatial relationships between the stimulus object or event and the observer affected the individual's ability to interpret or perceive a given stimulus situation (21,59,85,106). Rochlin (85) reported that individuals were less accurate in their perception of parallelness when judging tilted or obliquely-placed lines than when viewing either horizontal or vertical ones. Weine and Held (106) also reported definite changes in the perceived size of various angles as a function of the position of the angle in the visual field. Errors in estimated size were greatest for those stimuli located in the upper right and left quadrants of the visual field. Other investigators (59,82) have found that individuals tend to be more sensitive to stimuli in certain parts of the visual field than in others. Overton and Wiener (82) found, for instance, that the threshold for word recognition was significantly lower in the right visual field than in the left.

In a study by Kabrick (59), subjects responded with a simple movement to visual stimuli located at a variety of points in the visual field. Individual reaction time to visual stimuli positioned more than $30^0$ above the horizontal and/or more than $55^0$ from the center of the visual field was significantly slower than to stimuli located at other points in the visual field. Similarly, Banzejova (3) found that reaction times to stimuli placed at increasingly greater angular displacements from the point of visual fixation increased steadily and became significantly longer at positions of $50\text{-}70^0$ lateral displacement. Smith's work (92) has also indicated that various angular displacements of the visual field may affect the same motor performance in completely different ways.

Changes in the position of the observers may also affect the accuracy of the perceptual judgment (23,71). In a study by Matin (71), subjects viewed a dark room with monocular vision and were asked to report the location of a light flash relative to a fixation target which was seen three seconds before. Results indicated that if the subject faced the fixation target squarely, the threshold for the perception of displacement of the light flash was lower than if he were positioned to the right or the left of the fixation target. Damron (23) had subjects view slides from positions at various angular displacements along the horizontal plane. These angular displacements were directly related to positions which members of a football team might occupy on the playing field. Slides viewed from the most extreme angles (right or left ends) were the most difficult to recognize or perceive while those viewed from positions just off-center (right or left guard positions) were most easily perceived. Evidence such as this suggests of course that very subtle changes in the nature, background, or position of the stimulus or observer may affect the precision of a given visuo-perceptual judgment.

## VISUO-PERCEPTUAL CAPACITIES OF THE SKILLED AND UNSKILLED.

Depth Perception. Available research involving differences in visuo-perceptual capacities of performers of different skill levels is scanty and contradictory. Graybiel (44), reporting on Russian studies of vision and sports performance, has presented some evidence to support the notion that there may be a relationship between proficiency in certain sports skills and depth perception faculties. One such study indicated that, as a group, highly-skilled tennis players perceived depth more accurately than did players less highly skilled in the game of tennis. Other investigators (4, 81) have reported similar findings. Olsen (81), for example, used the Howard-Dolman apparatus to measure depth perception of athletes and non-athletes and found that athletes were significantly superior to non-athletes in their depth perception performances. Bannister and Blackburn (4) compared the inter-pupillary distances (purported to be an indirect measure of depth perception) of males classified as 'good' in games with those classified as 'poor' in games and reported that athletes tended to have significantly greater inter-pupillary distances and thus significantly better depth perception than the 'poor' or unskilled person.

Other studies have, on the other hand, found little or no evidence of differences in depth perception capacities between performers of different levels of ability. Clark and Warren (20), in an extensive investigation, reported the following results: (a) no significant relationship between inter-pupillary distance and depth perception performance; (b) no significant differences between athletes and non-athletes in inter-pupillary distance; and (c) no significant differences between athletes and non-athletes in depth perception as measured by performances on the Howard-Dolman apparatus. These investigators suggest that depth perception performances as measured by these particular techniques may be of a completely different nature than that which is involved in skilled performances in three-dimensional sports situations, and thus one should not expect to find differences between the athlete and the non-athlete.

Peripheral Vision and Visual Acuity. When aspects of vision and visual perception other than depth perception have been looked at as a basis for distinguishing among different levels of ability, results have again been conflicting. Olsen (81), studying the visual span of athletes and non-athletes, found that athletes were superior to non-athletes in span of apprehension. That is, athletes could take in or recognize a significantly larger number of elements in a single glance than could the non-athlete. Stroup (96), too, presented evidence of a significant difference between basketball players and nonbasketball players in terms of the extent of their peripheral fields of motion perception. Barclay (5), however, reported that success in basketball shooting was not, in any way, related to measures of peripheral vision.

In terms of visual acuity or sharpness of vision, both Barclay (5) and Tussing (98) reported no relationship between visual acuity and success in sports situations.

Other Visuo-Perceptual Categories. Results of a study of some 162 men and women of varying degrees of athletic prowess, ranging from the champion athlete to the low-skilled individual, indicated that certain visuo-perceptual capacities seemed to account, in large part, for differences in performances of skilled and unskilled individuals (74). These visuo-perceptual capacities included depth perception, static balance performances (thought to involve a visual factor of some nature), and performances on the McCloy's Blocks Test (a task which is believed to measure the individual's ability to make quick, adaptive judgments about visual stimuli). Pierson (83) found, however, no significant differences in the performances of fencers and non-fencers on the same Blocks test.

In a study involving the relationship between figure-ground perception and the accuracy of bodily adjustments made by the individual to an oncoming tennis ball, Kreiger (66) found that these two abilities were more highly correlated in individuals of intermediate tennis skill than in players of beginning skill levels.

Graybiel (44) has reported, again from the Russian studies on vision and sport, that certain basic differences may, in fact, exist in the delicacy and sensitivity of the 'eye-movement' apparatus which individuals classified as athletic or non-athletic may possess. It would appear that the athlete may have an 'eye-movement' apparatus which is superior to that of the non-athlete.

In summary, then, there appears to be some evidence to suggest that different visuo-perceptual abilities may at different times assume roles of varying importance in the performance of gross motor skills. Past investigations have not as yet been able to pinpoint the nature of the differences in visuo-perceptual capacities, if any, which may exist between the skilled and the unskilled individual.

## AGE AND VISUO-PERCEPTUAL CAPACITIES.

Depth Perception. Considerable capacity for depth perception may appear early in infancy. The famous 'visual cliff' study by Walk and Gibson (32), for example, indicated that even before six months of age, the child was able to perceive depth in the form of a drop-off. Bower (11) found that even younger infants responded accurately to differences in distances of cubes placed before them. That is, at six weeks, the infant was able to make some gross differentiation between objects that were nearer and those that were farther away from him. Gesell (30) reported that binocular convergence (the ability to focus both eyes accurately on an object and thus a forerunner of true depth perception) appeared, on the average, at the end of the second month. These findings suggest, then, that some primitive type of depth perception, geared to perceiving features of the environment which are ultimately essential for adaptation to the three-dimensional space world of the adult, are functional in the infant even as early as 1½ to 2 months.

Studies concerned with depth perception capacities in childhood (113) have shown that in a situation where natural environmental cues are present, the child, two years and above, can discriminate depth as accurately as can the adult. If such cues are removed, however, the child's performance deteriorates. In such a situation, the adult has little difficulty in continuing to perceive depth as accurately as before. Gesell (30) has noted that although a five year old may see no difference between a flat and a stereoscopic slide, a six or seven year old rarely if ever fails to see depth in the stereoscopic slide. It would appear that although the ability to perceive depth appears early, finely differentiated judgments of depth are not well-developed until the sixth or seventh year.

Spatial Directions. Evidence indicates that children master the various sectors of space in a fairly orderly sequence (30,62). Verticals are mastered first, followed by horizontals, and last by the apparently more complex obliques or diagonals. By seven or eight, the child has no difficulty distinguishing between the vertical and the horizontal, the upright versus the inverted, and most children at this age can learn rather easily to tell the difference between a horizontal and an oblique line. Discriminations involving vertical and oblique lines, however, are a little more difficult as are discriminations involving two oblique lines (56). Katsui (62) has noted that eight year olds, although having mastered most aspects of space, still have difficulty with right-left or mirror images. Not until about the age of nine or so then does the child gain complete mastery over the various facets of spatial direction. Studies concerned with the perception of the direction of moving objects as a function of age could not be found.

Perception of Movement. Not a great deal is known about the perception of movement in general and even less seems to be known about its development in children. Gesell (30) has reported that almost from the moment of birth, the child appears to show an awareness and fascination for movement in his environment. Haith (46) too has found that an infant, three to five days old, will respond positively to the intermittent movement of a visual stimulus.

This suggests that movement of objects in the environment may be one of the 'salient' features of the infant's space world and thus the perceptual mechanism of the young infant is geared to perceive movement from the very beginning of life.

According to Gesell (30), the child at five can follow a target moving at increased rates of speed and through fairly complex paths. Eight and nine year olds had progressed considerably in their judgments of the speed and direction of a moving target and rarely, if ever, overshot or lagged behind the target in their visual pursuit movements. Children of this age, however, seemed to be greatly influenced in their judgments of range or speed of movement by the total situation in which the movement occurred. For example, if two objects, started at the same point in space were moved, one along a straight path and the other along a very crooked path, the child when asked to make one 'go as far as' the other, stopped the former opposite to the latter regardless of the different length of the two paths(59). In terms of relative speed, one object was judged to move faster than another only when it was observed to go past the former. Thus perceptual judgments involving certain time-space-force concepts appear to be relatively undeveloped in the eight and nine year old.

In an isolated study of the effects of speed and direction of ball flight upon the catching performance of elementary school children, Bruce (16) reported that ball velocity significantly affected the catching performances of second and fourth grades but had no effect upon the catching performances of sixth graders. Younger children appeared to perform better when the ball was moving at a slower speed. The direction of ball flight had no effect upon the child's catching performance at any of the ages studied.

A recent study by Williams (109) indicated that the child may begin to develop a more refined capacity for making complex perceptual judgments about moving objects in space sometime during the upper elementary school years. For example, this study found that fourth, fifth, and sixth graders were significantly more accurate in judging the flight of a tennis ball than were first, second, and third graders. Williams reported that although children at six, seven or eight years of age responded quickly to the tennis ball, their judgments about the flight of that moving object were grossly inaccurate. Not until eleven years of age could the child make both rapid and accurate judgments relative to the flight of the moving object in space.

Other Perceptual Capacities. Gibson (31) reported a significant difference between the performances of second, fourth and sixth graders and those of adults in being able to pick out a specific form (a letter) from a context of other extraneous perceptual items. Younger children in this study required a significantly longer time to pick out the correct letter than did older children. Adults were always more efficient at performing this perceptual task than were children of any age. In a slightly different but related experiment, five and six year olds were asked to judge the 'lightness' of target objects when more than one object was presented at a time (6). These children showed great difficulty in making this perceptual judgment accurately. When targets were presented singly, however, the children performed at the same level as adults. Such studies as these point then to the presence of subtle but perhaps significant differences in the visuo-perceptual capacities of the child and the adult.

Overall, evidence would suggest that the child, by the end of the sixth or seventh year, is in terms of certain visuo-perceptual capacities (including depth perception and mastery of spatial direction) nearly mature.

Other visuo-perceptual capacities involving, for example, judgments about the flight of moving objects in three-dimensional space or the perception of relative speed of movement, continue to undergo refinement with age and may not become mature until after the age of eleven years. Age differences in visuo-perceptual capacities of the adolescent seems to have been little studied and no research relevant to the role of visuo-perceptual capacities in sports situations as a function of age could be found.

SUMMARY. Available evidence indicates that visual perception plays an important role in overt motor behavior. Studies which have investigated the nature of visuo-perceptual judgments in general have shown that such judgments are readily affected by a variety of factors, the most important of which seem to be the number or nature of the elements making up the stimulus complex and/or the spatial relationship between the stimulus and the observer. Studies involving the perception of velocity and/or direction of movement suggest that both of these elements may be important in the ultimate accuracy of judgments made about the movement of objects in space. However, most of the research reported by psychologists has dealt with the perception of movement of rods, lights, and/or disks in two-dimensional space. Few, if any, studies have looked at visuo-perceptual judgments of moving objects in three-dimensional space and no research has, to date, been directed toward the problem of defining the stimulus parameters which might affect the accuracy of the visuo-perceptual judgments involved in dynamic sports situations. The need for work directed toward the investigation and clarification of such phenomena is evident.

Although there is some evidence available to suggest that differences in visuo-perceptual abilities may exist between performers of different skill levels, such evidence is at present inconclusive. Studies which have been conducted along these lines have, in general, involved the use of 'static' measures of isolated aspects of the visuo-perceptual processes. For example, performances on tests of static depth perception have, more often than not, been compared to performances requiring rapid responses to moving objects in space. The vastly divergent nature of the abilities involved in these two types of situations has no doubt contributed to the tenuous and conflicting results reported. Research directly concerned with differences between the skilled and the unskilled in terms of the speed and accuracy of visuo-perceptual performances involving moving objects in space is notably lacking in the literature.

Age seems also to be an important factor affecting the individual's visuo-perceptual performance. Still, little or no study has been given to the question of whether or not such age differences continue to be important after early or middle childhood. Research concerned with the effects of age on the kind of visuo-perceptual judgments involved in three-dimensional sports situations is generally non-existent.

In summary, then, there seems to be little theoretical doubt that the visuo-perceptual mechanisms at work in dynamic sports situations are indeed complex and that the 'static' measures of the visual and/or visuo-perceptual processes which have heretofore been used by researchers in investigating such phenomena can neither adequately nor accurately describe the nature or importance of the functioning of such mechanisms. The need for further clarification of the nature of visuo-perceptual responses in gross motor performance and the development of measures and instrumentation which are sensitive to evaluating such problems is self-evident.

# CHAPTER III

## STATEMENT OF THE PROBLEM

The purpose of the present study was threefold: (i) to assess the effects of systematic variation in velocity and direction of ball flight upon visuo-perceptual judgments made about moving objects in space; (ii) to establish whether or not highly-skilled and poorly-skilled performers differ in their ability to make accurate visuo-perceptual judgments about the flight of moving objects in a three-dimensional sports situation, and (iii) to assess the effect of age or maturity level of the individual upon the speed and accuracy of such visuo-perceptual judgments.

### Problem I. Effects of systematic variation in velocity and direction of ball flight upon the speed and precision of visuo-perceptual judgments about moving objects in three-dimensional space.

Successful performance in many sports situations, it has been suggested, requires that the performer interact in precise ways with fast-moving objects in space. Successful adaptation to such a situation would seem to require that the performer make a judgment about certain stimulus characteristics of the moving object in space. Evidence indicates that, as a result of certain subtle changes in stimulus conditions, judgments about a given stimulus situation may vary markedly. This suggests then that the speed and accuracy with which visuo-perceptual judgments are made about moving objects in three-dimensional sports situations may vary as a function of differences in the speed and direction of the flight of the moving object. The following questions therefore should be important ones for physical educators to answer:

(a) What effect does the speed of the moving object have upon the visuo-perceptual judgments made by the sports performer,

(b) What effect does the horizontal and/or vertical direction of object flight have upon judgments made by the individual about the flight of the moving object, and

(c) Is there an interaction involving both speed and direction of object flight which makes for ease or difficulty in judging the flight of a moving object in three-dimensional space?

Problem II. Effects of level of skill upon the speed and accuracy of visuo-perceptual judgments made in three-dimensional sports situations.

Observation of the overt performance of a poorly-skilled individual reveals that he is deficient in his motor output, that is, that the movements he makes are frequently awkward as well as inefficient. We do not know from this simple observation, however, if the movement patterns of these individuals are a result of purely motor faculties such as lack of strength, speed of movement, etc., or if such performance inadequacies are in part due to an initially faulty interpretation of the visuo-perceptual cues involved in the motor performance. If, in fact, the initial task facing the performer in many sports situations is a visuo-perceptual judgment, then one might hypothesize that the poorly-skilled performer is poorly-skilled in part because he cannot 'interpret' differences in stimulus situations rapidly and accurately enough to order the proper adaptive movement. Conversely, this suggests that the skilled performer may be able to make both rapid and accurate judgments about a wide variety of stimulus conditions and thus perform more effectively in situations demanding refined visuo-perceptual judgments. The question of whether or not such differences in visuo-perceptual capacities do, in fact, exist between the skilled and the unskilled performer would seem to be an important one to answer.

Problem III. Effects of age or maturity level upon visuo-perceptual judgments about the speed and direction of moving objects in three-dimensional space.

Research suggests that visuo-perceptual abilities may be important in the performance of certain gross motor skills and that the ability to make certain refined visuo-perceptual judgments is partly a function of the age or maturity level of the individual. If this is true, then it should be of value to outline what age-maturity differences, if any, exist in the individual's ability to visually judge the flight of a moving object in three-dimensional space.

# CHAPTER IV

# PROCEDURES

Procedures relevant to the organization and collection of data are presented in this section. The major categories to be discussed are: (1) the task, (2) the general experimental schema, (3) the variables, (4) measures of the visuo-perceptual performance, (5) selection of the subjects, (6) collection of the data and (7) analysis of the data.

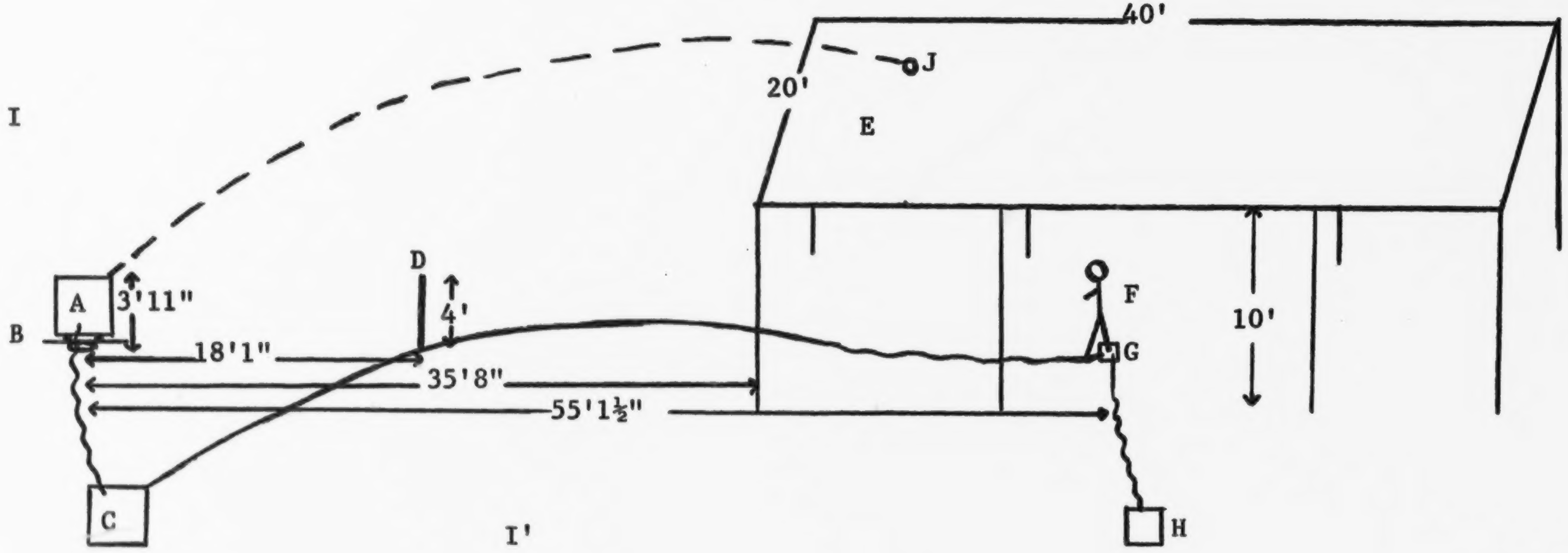
THE TASK. The problem under study was centered around the following experimental situation. A tennis ball was projected into the air from a Tennis Ball-Boy machine. This ball was interrupted in its flight by a canvas suspended four to five feet above the head of the subject who stood waiting at a prescribed point beneath the canvas. (See Figure 1, p. 30.) Subjects thus never actually came into physical contact with the ball and saw only the first portion of its flight.

The subject's task was, by using the visual cues received from the observable portion of the object's trajectory, to decide where the ball was going in its flight and to move to that spot on the floor where he judged he should be in order to catch the ball at chest height. In other words, the subject was asked to visually judge the path of the moving object, to decide upon an 'optimum' point for interception, and then to move as quickly as possible to that spot. The emphasis was not on how efficiently he moved to this 'selected' spot but rather upon how rapidly he could decide where to go and upon the ultimate accuracy of this judgment. (Specific instructions given to each subject may be found in Appendix A, p. 131 .)

FIGURE 1. GENERAL EXPERIMENTAL SET-UP

A = Ball Boy Machine
B = Rotatory Platform
C = Hale Reaction Timer
D = Visual Barrier
E = Canvas

F = Subject
G = Foot Pad
H = Dekan Timer
I,I' = Visual Background
J = Tennis Ball


40'
J
20'
I
E
D
A
3'11"
4'
F
B
10'
18'1"
G
35'8"
55'1½"
C
I'
H

THE GENERAL EXPERIMENTAL SCHEMA. The general experimental schema was as follows. See Figure 1, p. 30. (More detailed descriptions of the apparatus may be found in Appendix A, pp. 133-135.)

A = Tennis Ball-Boy Machine. A Tennis Ball-Boy, located in the west end of the Women's Gymnasium, was used to project tennis balls into the air under twelve (12) different combinations of speed and vertical and horizontal angles of projection.

B = Rotatory Platform. The Tennis Ball-Boy Machine was secured to the top of a rotating platform which consisted of a 2' x 3' heavy wooden strip attached to a metal pivotal base approximately six inches high. This rotatory platform was used to regulate the horizontal angles of object projection and thus the horizontal direction of object flight.

C = Hale Reaction Timer. A Hale Reaction Timer, located just to the right of the Tennis Ball-Boy machine, was used to initiate the action of the Ball-Boy machine and to measure the reaction time of the subject. That is, the clock on the Hale Reaction Timer was set-up to record the time required by the subject to judge the flight of the oncoming tennis ball.

D = Visual Barrier. A visual barrier, four feet high and ten feet wide, was erected directly in line with and at an eighteen foot distance from the Ball-Boy machine. The purpose of the visual barrier was to eliminate, as much as possible, any visual cues relative to the flight of the tennis ball that the subject might receive from sources other than the actual ball flight itself. For example, the Ball-Boy machine had to be rotated to the right and to the left to obtain the desired variation in horizontal direction of object flight. The movement of the machine itself could have served as an extraneous cue for judging the right-left direction of the ball's trajectory. The use of the visual barrier eliminated the possibility of using such cues. No sound cues were available to the subjects.

F = Subject's Starting Position. All subjects started from a common starting point underneath the canvas (E), approximately fifty-five feet (55') from the source of object projection. The subjects stood on a large footpad, facing the Ball-Boy, and awaited the projection of the ball in a relaxed, ready position.

G = Double Footpad. A double footpad was secured to the gymnasium floor by masking tape. This footpad consisted of two individual footpads placed one on top of the other and taped together with adhesive tape. Footpad 1 was connected to the Dekan Timer and activated the clock used to record the movement time of the subject. Footpad 2 was wired to the reaction time clock on the Hale Reaction Timer.

H = Dekan Timer. A Dekan Timer was used to record the movement time of the subject, that is, the amount of time needed by the subject to get to his 'judged' point of interception. This timer was located to the left and approximately twenty feet (20') away from the subject's starting point under the canvas. This location permitted the tester to clearly observe the movement of the subject in any direction.

I = Visual Background and Lighting. A dark blue curtain was hung behind the Ball-Boy machine so that it stretched across the main portions of the subject's visual field. This provided a homogeneous background against which to view the moving objects in space. Large unbleached muslin curtains were used to cover the side windows in the gymnasium (I') to further insure the consistency of viewing conditions. Only the area in front and to the sides of the canvassed area was directly lighted by overhead lamps located on the ceiling of the gymnasium. The remainder of the gymnasium was lighted indirectly by natural sunlight.

J = *Tennis Balls*. Balls used in the study were forty-eight (48) unused, white MacGregor Tournament tennis balls.

*THE VARIABLES*. Five variables were selected for study in this investigation. They included:

1. *Age or Maturity Level*. Subjects were selected from three grade levels: junior high, high school, and college age populations. These groupings provided the basis for looking at differences in visuo-perceptual performances as a function of age or grade level.

2. *Skill level*. Subjects were further classified into skilled and non-skilled groupings based upon baseball experience, in order to assess the effects of level of skill upon visual judgments concerning the flight of moving objects in three-dimensional space.

3. *Speed of Object Projection*. Two levels of speed of object projection were selected for study. See Table 1 below. This variation in speed permitted an assessment of the effects of velocity of ball flight upon judgments of the moving objects in space.

TABLE 1. DESCRIPTION OF THE EXPERIMENTAL VARIABLES

| | DESCRIPTION OF VARIABLE | | |
|---|---|---|---|
| LEVEL | SPEED | HORIZONTAL ANGLE | VERTICAL ANGLE |
| 1 | Fast-48.0'/sec. | Right-$5^0$ | High-$44^0 10'$ |
| 2 | Slow-39.7'/sec. | Center-$0^0$ | Low-$34^0 22'$ |
| 3 | | Left-$5^0$ | |

4. Vertical Angle of Object Projection. Objects were projected at each of two vertical angles. The two levels of vertical angle of projection were used to assess the effects of the vertical direction of object flight upon visual judgments concerning the flight of the moving object.

5. Horizontal Angle of Object Projection. Objects were projected at each of three horizontal angles: (a) directly at the subject; (b) to the right of the subject; and (c) to the left of the subject. These variations in horizontal angle of projection served as the basis for determining differences in visuo-perceptual judgments as a function of the horizontal direction of object flight.

### Selection of the Levels of Speed, Vertical and Horizontal Angles of Object Projection.

Speed. The primary considerations in the selection of the two levels of speed were (1) the variation in force with which the machine was designed to project the ball and (2) the desirability of allowing the subjects sufficient time, when starting from a common point of origin, to actually intercept the ball had it not been interrupted in its flight by the canvas suspended over the subject's head.

The Tennis Ball-Boy Machine used in this study was designed to project balls at each of three different speeds. (These speeds were regulated by a lever located at the lower-right front of the machine.) Forty (40) balls were projected at each of these speeds (in combination with four different vertical angles) in order to determine whether or not balls projected at these three speeds could be successfully intercepted at chest height by the average individual. Subjective evaluations of the catching performances of two freshman women enrolled in the General Required College Physical Education Program at the University of Toledo indicated that, with both subjects starting at the same point in the center of the floor, balls projected at any of the three speeds could, in fact, be reached in time by these subjects to be intercepted at chest height. Since the maximum and minimum speeds at which the Tennis Ball-Boy could project a tennis ball provided for the greatest differences in object flights in terms of the horizontal distances covered by the trajectories, these two speeds were selected as the two levels of the speed variable.

_Vertical Angle of Projection_. Four criteria were used in the selection of the vertical angles of object projection:

(a) the maximum vertical angle of projection had to be such that the object (projected at maximum speed) would not be interrupted at any point in its flight by the beams on the ceiling of the gymnasium,

(b) the minimum vertical angle of projection had to be great enough to insure that the ball, when projected at either of the two speeds, could be easily intercepted by a canvas suspended over the head of the subject;

(c) the difference between the two angles had to be large enough to allow for immediately recognizable differences in the vertical direction of object flights, and

(d) balls projected at either of the vertical angles selected had to allow the subject sufficient time to reach the desired point of interception.

Working within the limits of these criteria, four settings of the vertical angle of projection were selected for further experimentation. These will be referred to as Vertical Angle I, Vertical Angle II, Vertical Angle III, and Vertical Angle IV. Forty (40) balls were then projected at each of these four angles in combination with the two speeds previously selected. Subjective observations of these projections indicated that only balls projected at Vertical Angle I came into contact with structures on the ceiling of the gymnasium. Since it was desired to have the two angles as divergent as possible, Vertical Angles II and IV were selected for additional pilot work.

Again forty (40) balls were projected at each of these two angles (in combination with the two levels of speed). Subjective evaluation of the catching performances of two college freshman women indicated that balls projected at either of the two vertical angles could be reached in time by these subjects to be successfully intercepted. These two angles were then adopted as the two levels of the vertical angle of object projection.

Subsequent to the selection of the two speeds and vertical angles of projection, fifty (50) additional balls were shot at each of the four combinations of these variables in order to determine the units of each of these variables. (See Estimation of the Values of the Levels of Speed and Vertical Angles of Object Projection, p. 38.)

Horizontal Angle of Projection. To aid in the selection of the horizontal angles of projection, a large protractor was constructed and placed under the center of the pivotal platform upon which the machine rested. (See Appendix A, p.135.) The machine itself could be rotated so that the horizontal angle of projection ranged from $0^0$ to $45^0$ right or left. The specific angle of projection was clearly indicated on the protractor by an arrow which was drawn on the front of the pivotal platform and which extended out over the surface of the protractor.

Several horizontal angles of projection were selected for investigation on the basis of the distance (right-left) involved in the subject's movement from his original starting point to the optimum point of interception. The angles selected for study are shown in Table 2 shown below. Ten balls were projected at $3^0$, $5^0$, $7^0$, and $9^0$ and the catching performances of two college female subjects used in previous pilot investigations observed. (Horizontal angles of projection greater than ten degrees or less than three were not used in pilot investigations because the distance involved in the first case was too great, in the second too small, to be of practical value in the present study.) Each series of ten balls was projected in a predetermined random right-left order.

TABLE 2. HORIZONTAL ANGLES OF PROJECTION: DISTANCE IN FEET RIGHT OR LEFT OF SUBJECT'S STARTING POINT TO OPTIMUM POINT OF INTERCEPTION

| | HORIZONTAL ANGLE OF PROJECTION | | | | | |
|---|---|---|---|---|---|---|
| CONDITION | $1^0$ | $3^0$ | $5^0$ | $7^0$ | $9^0$ | $11^0$ |
| Slow-High | .84' | 2.50' | 4.94' | 5.85' | 7.50' | 9.16' |
| Slow-Low | .87' | 2.60' | 5.15' | 6.09' | 7.80' | 9.54' |
| Fast-High | 1.13' | 3.46' | 6.73' | 7.92' | 10.16' | 12.40' |
| Fast-Low | 1.17' | 3.56' | 6.94' | 8.16' | 10.48' | 12.78' |

The results of this preliminary investigation indicated that only under the five degree condition did the subject have sufficient time to get to the desired point of interception easily under all conditions and yet still have to make a definite move to the right or left. In addition, this variation in horizontal angle of projection also provided for easily recognizable differences in object trajectories in terms of the horizontal direction of object flight. For these reasons, then, the five degree ($5^0$) horizontal angle of projection was selected.

Estimation of the Values of the Speed and Vertical Angle Variables. Fifty (50) balls were projected at each of the four combinations of speed and vertical angles of projection previously selected for use in the study to determine the numerical values of these speed and vertical angle of projection variables. These combinations included: Fast Speed-High Angle; Fast Speed-Low Angle; Slow Speed-High Angle; and Slow Speed-Low Angle. The procedure used in estimating these figures was as follows. The time of flight of each object projection was measured to the nearest one-hundredth of a second and the horizontal distance of that flight recorded in feet. The height at which objects were projected was constant, 3.5 feet above the ground. The velocity and vertical angle of projection of each of the ball flights was calculated by procedures described by Mortimer (76).

One hundred individual estimates of each of the two speeds and vertical angles of projection were obtained. The average of these one hundred estimates then were the assigned numerical values of these variables. The average values of the one hundred estimates are shown in Table 1, p.33. The two speeds of object projection were identified as: Fast Speed or 48.0 feet per/second and Slow Speed or 39.7 feet per/second. The vertical angles of object projection were: High Angle, $44^0$ 10' and Low Angle, $24^0$ 22'. Other characteristics of the object trajectories are summarized in Table 3, p. 39.

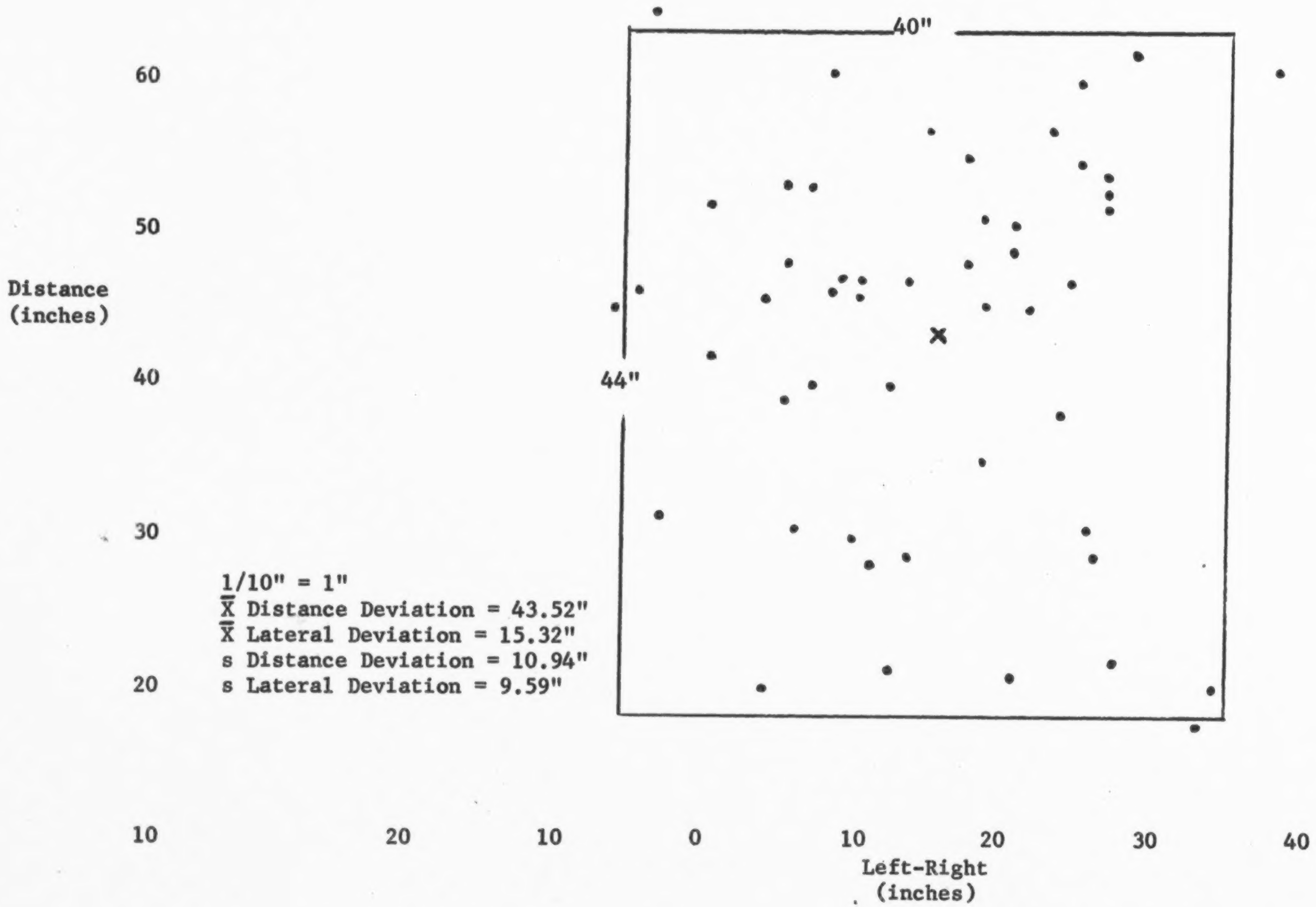
TABLE 3. CHARACTERISTICS OF OBJECT TRAJECTORIES

| | HORIZONTAL DISTANCES | | | | VERTICAL DISTANCE TO HIGH POINT | TIME | |
|---|---|---|---|---|---|---|---|
| CONDITION | Total | High Point | 3' Above Floor | 4' Above Floor | | Total | To High Point |
| Slow-High | 50.58' | 23.54' | 47.67' | 47.08' | 16.59' | 1.87 | .884 |
| Slow-Low | 53.9 ' | 24.65' | 49.82' | 49.30' | 13.71' | 1.65 | .777 |
| Fast-High | 68.5 ' | 32.15' | 65.07' | 64.26' | 18.16' | 2.03 | .938 |
| Fast-Low | 72.25' | 32.98' | 66.73' | 65.96' | 13.72' | 1.71 | .776 |

Consistency of Object Projections. The standard deviation of the distribution of end points of fifty (50) object projections was used as an estimate of the consistency with which the machine projected balls to the same spot, trial after trial. Since the consistency of object projections could logically be assumed to be the same regardless of horizontal angle of projection, balls were projected at a single horizontal angle (0°) and standard deviations for flights based on speed and vertical angles of projection only were determined.

The distribution of the landing points of the four main object trajectories are shown in Figures 2,3,4 and 5 on pages 40-43. Means and standard deviations were calculated for both right-left and short-long deviations in landing points. These figures are shown in Table 4, p. 44. In general, the variability in the landing points of the four object trajectories was minimal. Balls projected at a 44° vertical angle of projection appeared to be slightly more variable than those projected at 34°.

FIGURE 2. DISTRIBUTION OF LANDING POINTS OF 50 OBJECT PROJECTIONS: FAST-HIGH CONDITION



1/10" = 1"
$\bar{X}$ Distance Deviation = 43.52"
$\bar{X}$ Lateral Deviation = 15.32"
s Distance Deviation = 10.94"
s Lateral Deviation = 9.59"

FIGURE 3. DISTRIBUTION OF LANDING POINTS OF 50 OBJECT PROJECTIONS: FAST-LOW CONDITION

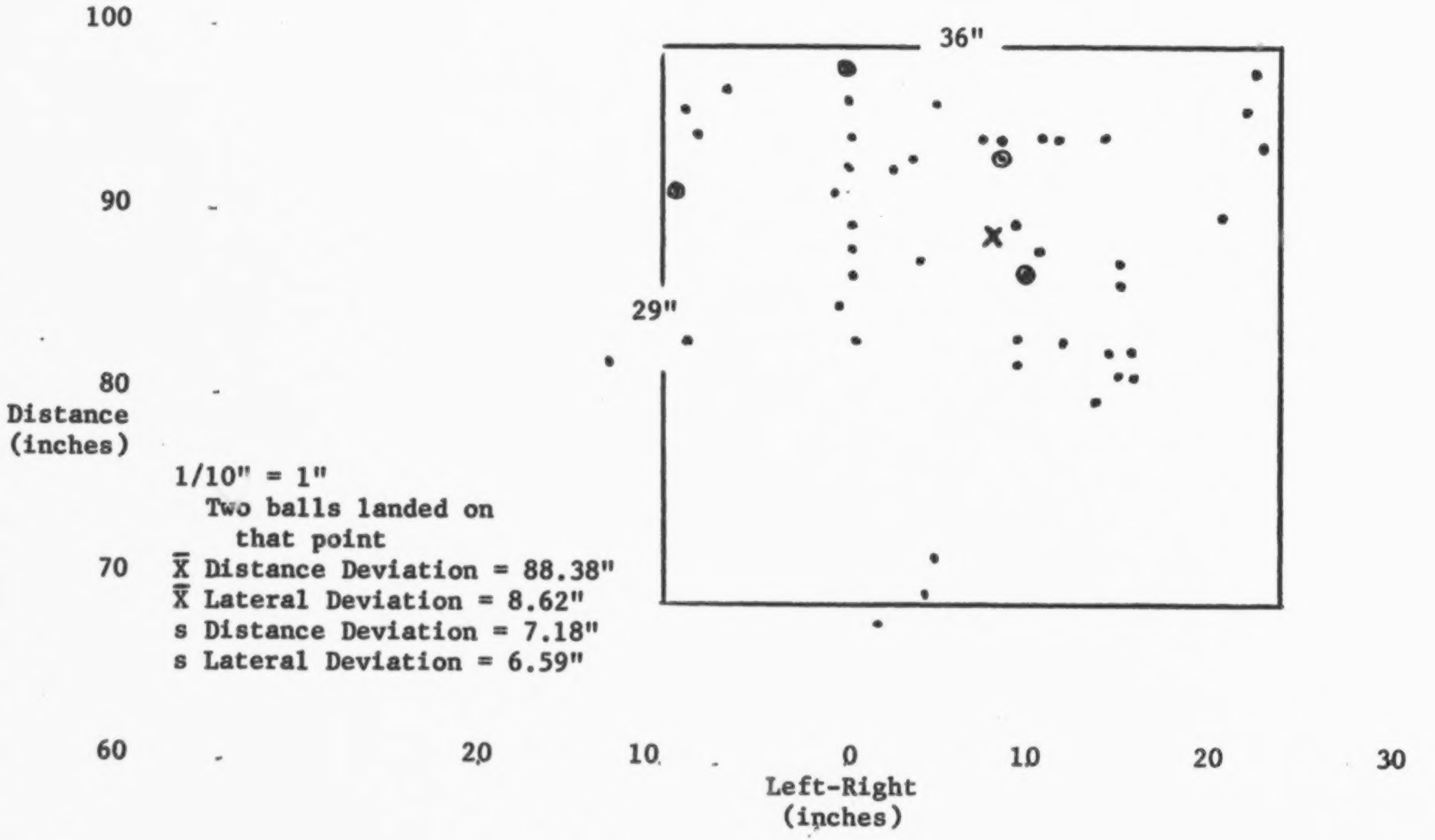
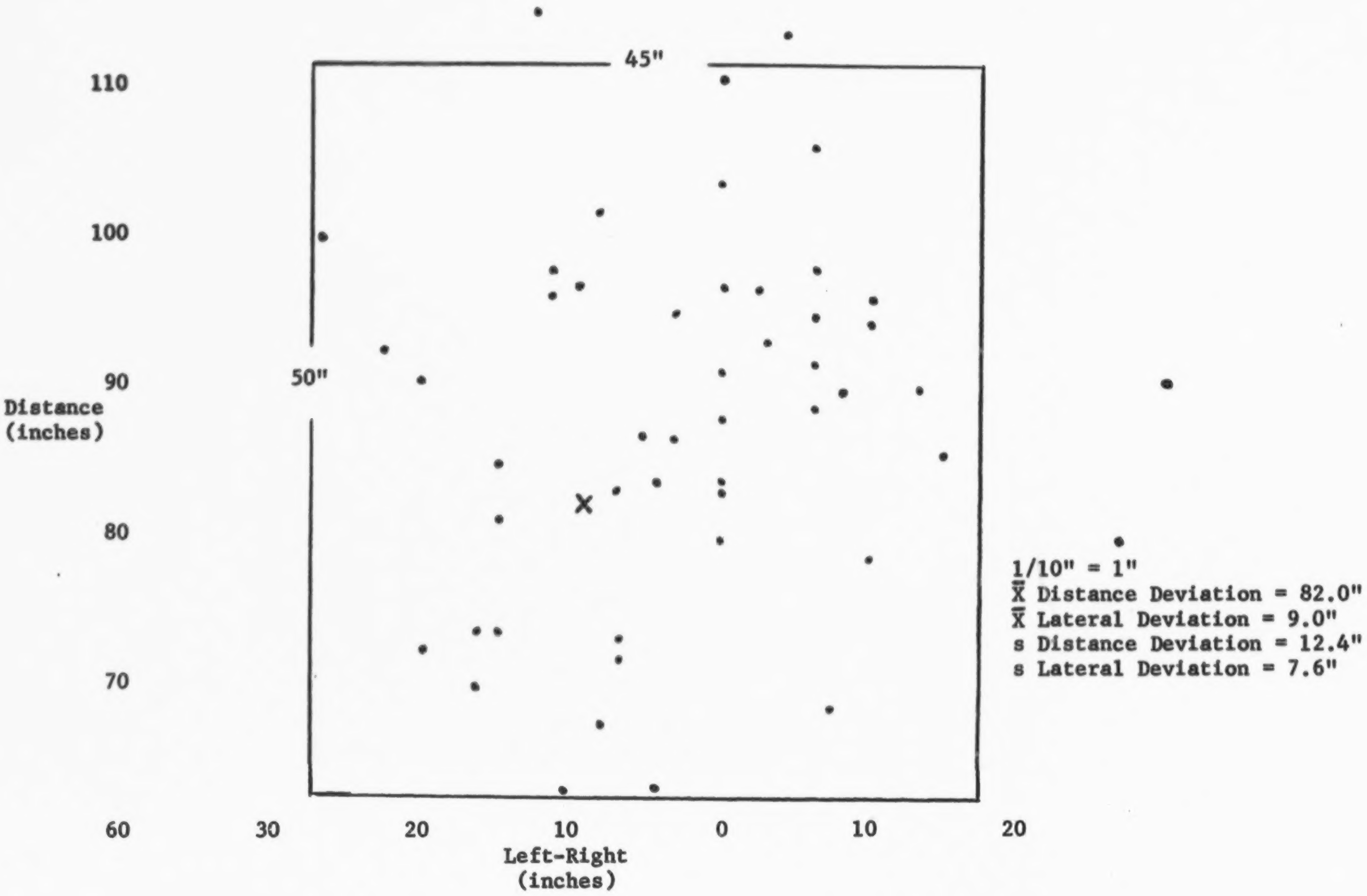
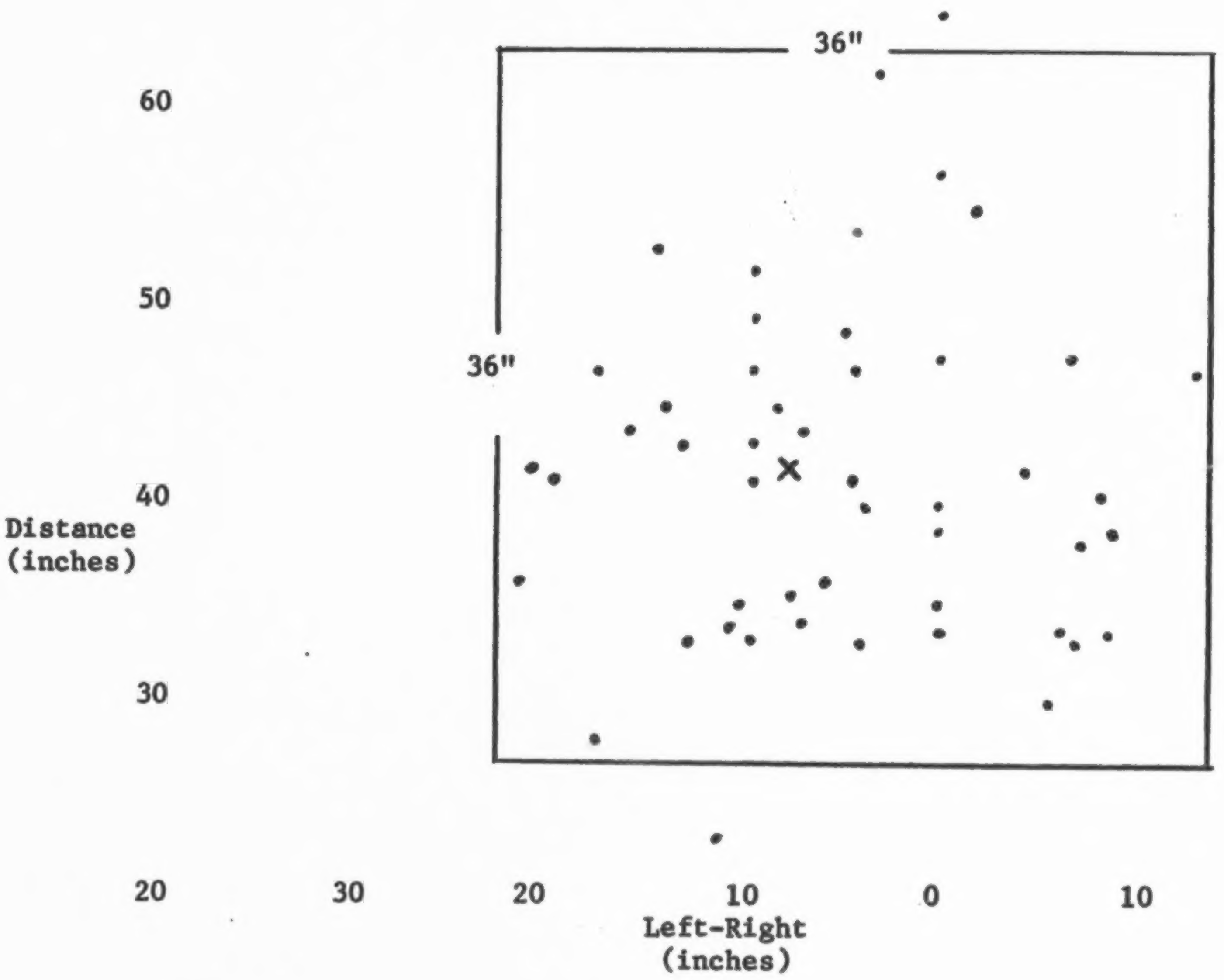


FIGURE 4. DISTRIBUTION OF LANDING POINTS OF 50 OBJECT PROJECTIONS: SLOW-HIGH CONDITION



1/10" = 1"
$\bar{\bar{X}}$ Distance Deviation = 82.0"
$\bar{\bar{X}}$ Lateral Deviation = 9.0"
s Distance Deviation = 12.4"
s Lateral Deviation = 7.6"

FIGURE 5. DISTRIBUTION OF LANDING POINTS OF 50 OBJECT PROJECTIONS: SLOW-LOW CONDITION



$\overline{X}$ Distance Deviation = 41.84"
$\overline{X}$ Lateral Deviation = 7.78"
s Distance Deviation = 8.51"
s Lateral Deviation = 5.24"

TABLE 4. SUMMARY TABLE: MEANS, STANDARD DEVIATIONS, AND RANGE OF THE DISTRIBUTION OF LANDING POINTS OF 50 OBJECT PROJECTIONS (IN INCHES)

| | SLOW SPEED-HIGH ANGLE | | SLOW SPEED-LOW ANGLE | | FAST SPEED-HIGH ANGLE | | FAST SPEED-LOW ANGLE | |
|---|---|---|---|---|---|---|---|---|
| | Dist. Dev. | Lat. Dev. | Dist. Dev. | Lat. Dev. | Dist. Dev. | Lat. Dev. | Dist. Dev. | Lat. Dev. |
| MEAN | 82.0" | 9.0" | 41.84" | 7.78" | 43.32" | 15.32" | 88.38" | 8.62" |
| STANDARD DEVIATION | 12.4" | 7.6" | 8.51" | 5.24" | 10.94" | 5.59" | 7.18" | 6.59" |
| RANGE | 52.0" | 45.0" | 42.00" | 43.00" | 47.00" | 44.00" | 31.00" | 38.00" |
| NO. WITHIN OAOI* | 46 | | 48 | | 46 | | 48 | |
| DIMENSIONS OF OAOI* | 50" X 45" | | 36" X 36" | | 44" X 40" | | 29" X 36" | |

*Optimum area of interception

MEASURES OF THE VISUO-PERCEPTUAL PERFORMANCE. Measures of the visuo-perceptual performance included reaction time, movement time, and three measures of the accuracy of the spatial judgment.

Reaction Time. Reaction time was defined as the period of time elapsing between the projection of the ball from the Ball-Boy machine and the subject's first gross overt movement toward the spot on the floor where he judged he should be to intercept the ball at chest height.

To measure reaction time, an electical circuit was set up so that a clock, Glock A, on the Hale Reaction Timer was started simultaneously with the projection of the ball. (See Appendix A, p.    for a detailed description of this circuit.) The circuit was closed and the clock stopped when the subject moved away from his initial starting position. Time was recorded to the nearest one-hundredth of a second. This measure served as an estimate of the speed with which visual judgments of the flight of the tennis ball were made.

Movement Time. Movement time, defined as the time elapsing between the subject's first gross overt movement away from his original starting position and his arrival at his 'selected' point of interception was measured by a second electrical circuit. This circuit was arranged so that a Dekan Timer was started when the subject stepped off the footpad. The Dekan timer was stopped manually by the experimenter when the subject came to a complete stop at his 'selected' point of interception. Time was again recorded to the nearest one-hundredth of a second and measured the time required by the subject to get to his 'selected' point of interception.

THE OPTIMUM AREA OF INTERCEPTION. To establish a basis for measuring the accuracy of the subject's spatial judgment, the concept of an 'optimum area of interception' was outlined. The logic behind the derivation of this concept was as follows. First, a 'good' or 'successful' catch may be defined in terms of the position in which the object is intercepted in relationship to the body. For example, a 'good' catch might be one in which the ball is intercepted in front of the body at waist height or as one in which the ball is intercepted at the side of the body at shoulder level, and so on. Thus a 'good' catch may be distinguished, operationally, from a 'poor' catch simply by stating the height and the spatial position in relation to the body in which the ball is to be intercepted.

Such a definition of catching performance leads to the concept of an 'optimum point of interception'. If a catching performance is defined in terms of the height and spatial position (relative to the body) in which the ball is to be intercepted, it follows then that there must exist an identifiable point or position in space where the individual must be if he is to contact or catch the object successfully. That is, for any catching performance, defined in the above terms, there exists an 'optimum point of interception', the exact value of which is definable.

Without the aid of precise measuring devises to detect minute differences in body position, however, it seemed reasonable that an individual might assume and/or occupy a number of positions in space and still be subjectively judged as having intercepted the ball in an appropriate manner. In addition, some inconsistency, due to variation in the projection mechanism of the machine itself, was known to exist in the various ball flights. This made the concept of a single point of object interception untenable. Therefore an attempt was made to define that range of points in space within which an individual might position himself and still successfully catch an object according to some set standard. This gave rise to the concept of Optimum Area of Interception. For purposes of this study, then, the concept of an 'optimum area of interception' was adopted and defined as that 'spatial area within which an individual must position himself in order to catch a tennis ball in front of the body, at chest height, with the performer in an upright position and the arms held close to the body.'

Dimensions of the Optimum Area of Interception. An optimum area of interception was established for each of the twelve conditions of object projection. The dimensions of these twelve optimum areas of interception were determined as follows:

(1) First, a 'good' catch was defined, in conjunction with the definition of the 'optimum area of interception', as a ball intercepted at chest height with the body in an upright position and the arms

close to the body. This particular definition of catching performance was adopted because it appeared to be most similar to the position in which baseball outfielders catch 'easy' fly balls.

(2) The average height of subjects in each of the age groups involved in the study was determined. (See Appendix A, p.138 .) Reference to the human factors literature (7,73) indicated that average chest height for these age-height groups was: junior high - three feet; high school and college - four feet.

(3) The optimum point of interception for balls projected under each of the twelve conditions of speed, vertical and horizontal angles of projection was established. These optimum points of interception were based on estimates of the horizontal distance covered by the object in its flight when at heights three and four feet above the floor. These values are shown in Table 3, p. 39. Since the differences in horizontal distance of object flights at points three and four feet above the floor were negligible, a single height, the three foot height of interception, was arbitrarily adopted and used in defining the initial dimensions of the optimum areas of interception for all age groups.

(4) The range, mean, and standard deviation of each of the eight distributions of the landing points of 50 object projections were then used as a guideline in establishing the original dimensions of the optimum areas of interception. (See Table 4, p. 44.) For purposes of pilot investigations, the dimensions of the optimum areas of interception were arbitrarily set at four times the standard deviation of the distribution of landing points of the

original 50 object projections. The original dimensions of the various 'optimum areas of interception' are shown in Table 4, p. 44.

Experimental Evaluation of the Dimensions of 'Optimum Areas of Interception'. Using the average horizontal distance covered by the object in its flight as the center point, 'optimum landing areas' for all twelve object flights, based upon the dimensions shown in Table 4, p.44, were outlined on the gymnasium floor with masking tape. Twenty balls were then projected to each of these areas to determine whether or not balls projected from the machine would, in fact, land within the areas outlined. Results shown in Table 5, p. 49 indicated that a minimum of nineteen of the twenty balls projected from the machine landed in each of the areas as outlined.

Further experimentation was then undertaken: (a) to determine whether or not the size of these areas was adequate to accomodate the various foot positions which subjects might assume in their efforts to reach a 'selected' point of interception quickly, and (b) to determine if subjects could intercept balls in the manner prescribed when positioned outside boundaries of the optimum area of interception as originally defined. Two freshman women enrolled in the General College Physical Education program at the University of Toledo served as subjects in the investigation of these problems. Both subjects were approximately 5'4" tall.

Problem I. Using the 'optimum point' of interception as the center point, four optimum areas of interception, based on all possible combinations of speed and vertical angle of projection, were outlined on the gymnasium floor. Each subject was instructed to stand, in turn, in the center of each of the outlined areas of interception and to catch each ball projected from

TABLE 5. NUMBER AND PERCENTAGE OF 60 BALLS LANDING IN OUTLINED OPTIMUM AREAS OF INTERCEPTION

| CONDITION | NUMBER LANDING IN OUTLINED AREA | % LANDING IN OUTLINED AREA |
|---|---|---|
| Fast-Right-Low | 20 | 100 |
| Fast-Center-Low | 20 | 100 |
| Fast-Left-Low | 20 | 100 |
| FAST-LOW | 60 | 100% |
| Fast-Right-High | 20 | 100 |
| Fast-Center-High | 19 | 95 |
| Fast-Left-High | 20 | 100 |
| FAST-HIGH | 59 | 98.3% |
| Slow-Right-Low | 20 | 100 |
| Slow-Center-Low | 20 | 100 |
| Slow-Left-Low | 19 | 95 |
| SLOW-LOW | 59 | 98.3% |
| Slow-Right-High | 19 | 95 |
| Slow-Center-High | 19 | 95 |
| Slow-Left-High | 20 | 100 |
| SLOW-HIGH | 58 | 96.7% |

the machine in front of the body at chest height with the body in an upright position and the arms held close to the sides. Thirty balls were then projected to each subject while she stood in each of the four areas. The 'successfulness' of each individual catching performance was subjectively judged by the Experimenter. At no time were subjects permitted to step outside the masking tape boundaries to catch a ball.

Results indicated that when subjects were positioned within a given 'optimum area of interception' and allowed to move freely within that area, over 95% of the balls projected to that area were caught in the manner prescribed. The foot position assumed by the subject appeared to have little

γ

effect upon the general catching performance. (For specific percentages of balls successfully caught in each area, see Table 6 below.)

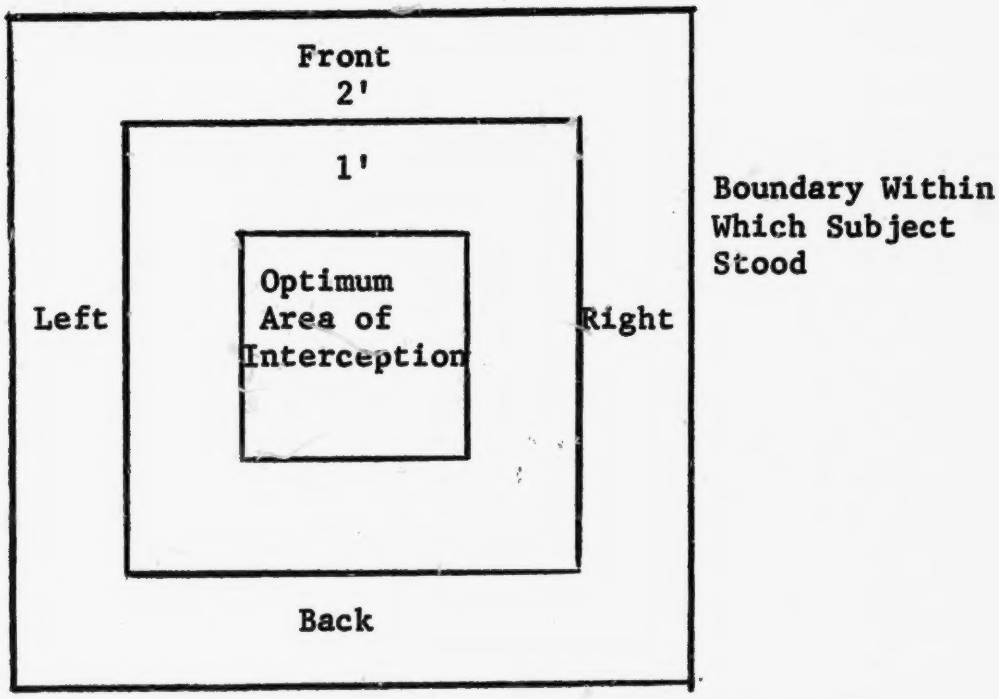
TABLE 6. PILOT INVESTIGATION I: NUMBER AND PERCENTAGE OF 60 BALLS CAUGHT WITHIN OPTIMUM AREA OF INTERCEPTION

| CONDITION | TOTAL NO. CAUGHT | % CAUGHT |
|---|---|---|
| FAST-LOW | 59 | 98.3% |
| FAST-HIGH | 57 | 95.0% |
| SLOW-LOW | 58 | 96.7% |
| SLOW-HIGH | 57 | 95.0% |

Problem II. An additional pilot investigation was undertaken to determine whether or not balls could be 'successfully' caught outside the optimum area of interception. To investigate this problem, additional lines were placed at one and two foot intervals beyond the edges of the original boundary lines of the optimum areas of interception. See Figure 6, p. 51. Each subject was positioned, in turn, at a point within these boundary lines. Ten balls were projected to each subject while she stood in each of four different positions: in front, in back, to the right, and to the left of the four main optimum areas of interception. This procedure was carried out separately for the one and two foot boundary line areas.

Subjects were instructed to catch the balls as they had in the previous investigation. The 'goodness' of each catching performance was judged by the Experimenter, and subjects again were not permitted to step outside the boundary lines in any direction in order to catch a ball.

FIGURE 6. PILOT INVESTIGATION II: BOUNDARY LINES ADDED TO OPTIMUM AREAS OF INTERCEPTION


Front
2'
1'
Optimum Area of Interception
Left
Right
Back
Boundary Within Which Subject Stood

The results of each of these series of object projections are shown in Table 7, below. Observation of the 'successful' catching performance for all areas indicated that only eight of 320 balls projected were caught 'successfully' within one foot of the original boundary of the 'optimum areas of

TABLE 7. PILOT INVESTIGATION II: NUMBER OF BALLS 'SUCCESSFULLY' CAUGHT WITHIN THE ONE AND TWO FOOT BOUNDARY AREAS

| | ONE FOOT BOUNDARY | | TWO FOOT BOUNDARY | |
|---|---|---|---|---|
| CONDITION | Number Projected | Number Caught | Number Projected | Number Caught |
| Fast-High | 80 | 2 | 80 | 1 |
| Fast-Low | 80 | 1 | 80 | 0 |
| Slow-High | 80 | 3 | 80 | 2 |
| Slow-Low | 80 | 2 | 80 | 0 |
| TOTAL | 320 | 8* | 320 | 3** |

*2.5% or approximately 2 out of 96

**0.009%

interception'. That is, only 2.5% of the balls projected were successfully intercepted by subjects standing somewhere within a one foot distance of the 'optimum area of interception' as originally defined. When positioned two feet away, only three successful catches were made. This is less than .01% of the total number of balls projected.

Based on these observations, then, the dimensions of the 'optimum areas of interception' as originally defined were adopted for use in this study. These areas are shown schematically in Figure 7, p. 53.

Measures of the Spatial Judgment. Measures of the spatial judgment consisted of the deviation, in inches, of the subject's final position in space from the appropriate area of interception and included distance or depth error, lateral deviation or right-left error, and absolute error or radial deviation.

1. Radial Error. Radial errors, represented by the Line BC in Figure 8, p. 54, consisted of the absolute deviation (in inches) of the subject's 'selected' position on the floor from the nearest edge of the 'optimum area of interception'. This provided an estimate of the overall precision of the individual's spatial judgment.

2. Distance Error. Distance errors, shown in the diagram (Figure 8, p. 54) by the line CD, consisted of the front-back deviations (in inches) of the subject's final position on the floor from the nearest edge of the square defining the 'optimum area of interception'. This measure provided an estimate of the distance or depth error made by the subject in judging the flight of the moving object.

3. Lateral Error. Lateral errors, represented in the diagram (Figure 8, p. 54) as the Line BD, were the right-left deviations (in inches) of the

FIGURE 7. SCHEMATIC REPRESENTATION OF THE SIZE AND LOCATION OF THE TWELVE 'OPTIMUM AREAS OF INTERCEPTION'

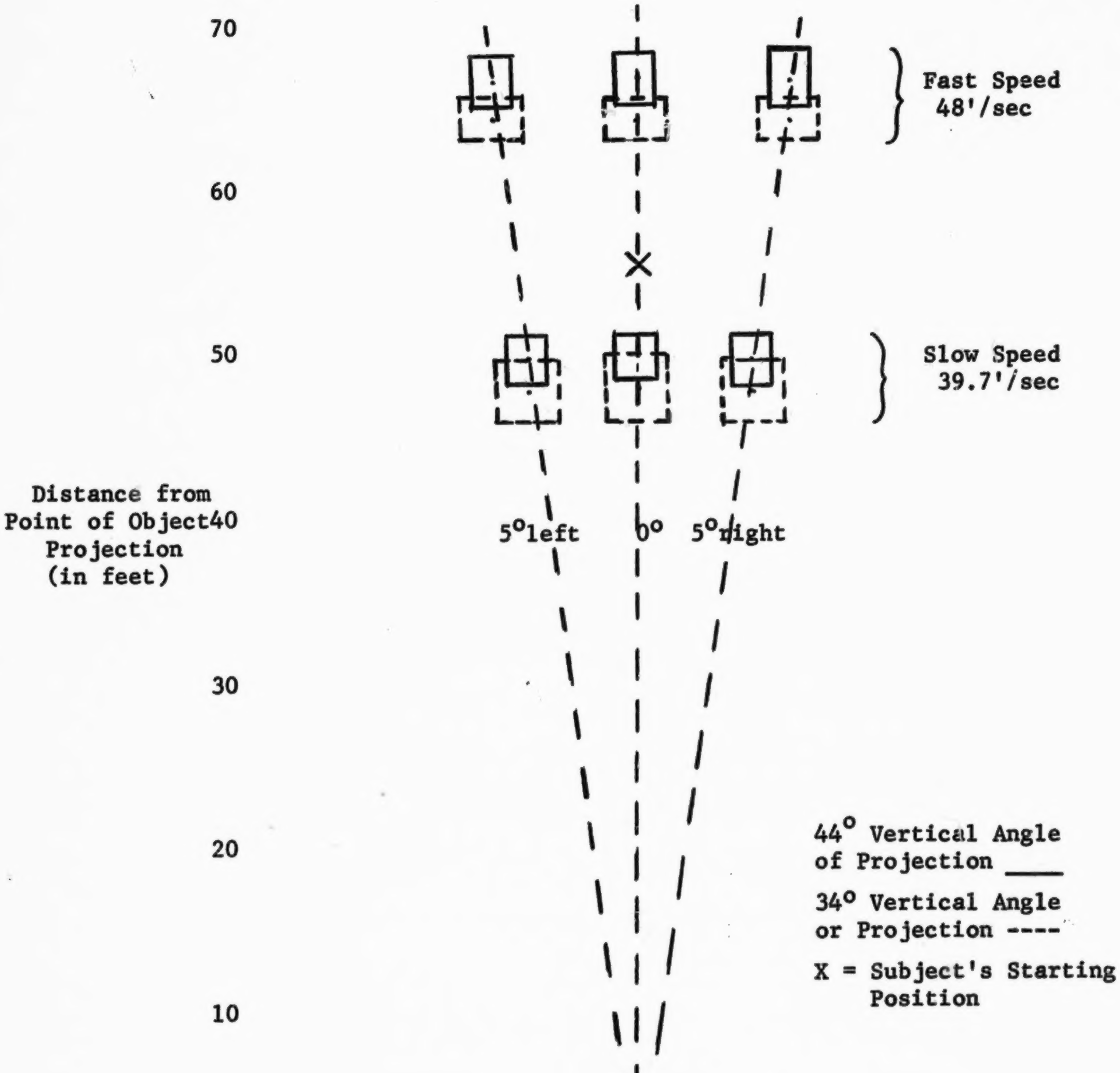
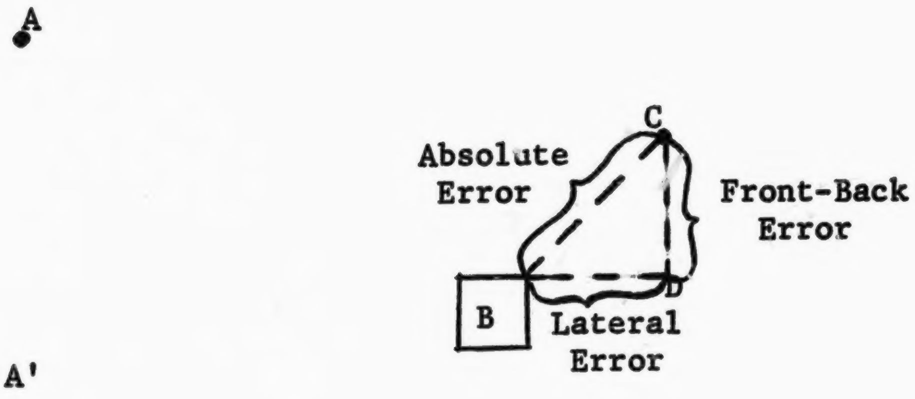

70
60
50
40
30
20
10
Distance from Point of Object Projection (in feet)
1" = 1'
Fast Speed 48'/sec
Slow Speed 39.7'/sec
5°left
0°
5°right
44° Vertical Angle of Projection ____
34° Vertical Angle or Projection ----
X = Subject's Starting Position
Point of Object Projection

FIGURE 8. DIAGRAMMATIC REPRESENTATION OF THE MEASURES OF THE SPATIAL JUDGMENT



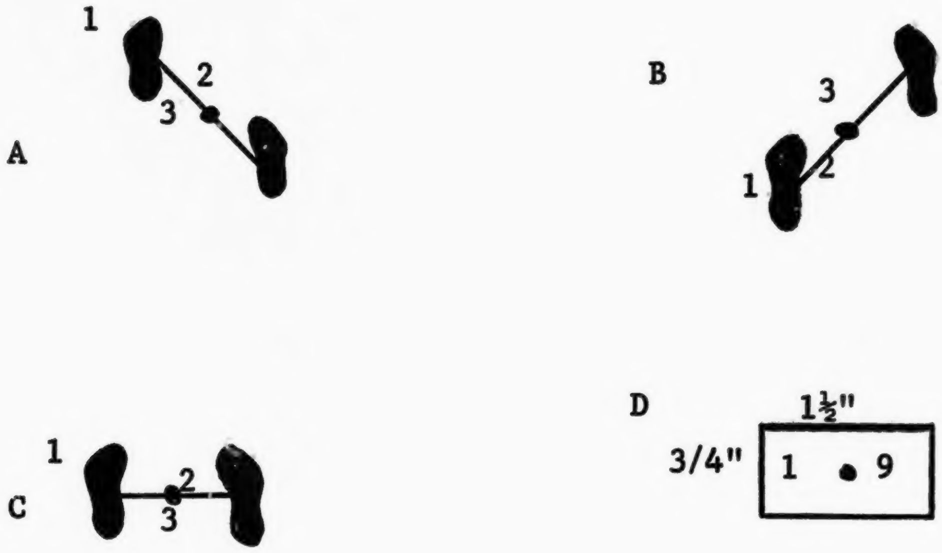
A = Point of Object Projection
A = Subject's Starting Position
B = Optimum area of Interception
C = Subject's 'Selected' Points of Interception

Line BC = Radial or Absolute Error
Line BD = Lateral or Right-Left Error
Line CD = Front-Back or Depth Error

subject's final position in space from the nearest edge of the square defining the 'optimum area of interception'. This measure provided an estimate of the accuracy of the visual judgments of the subject in terms of right-left error.

Determination of the Subject's Selected Point of Interception. The subject was instructed to remain in the position which he had selected as the optimum point of interception until it had been appropriately marked by the Experimenter. The position assumed by the subject was indicated by placing a piece of masking tape, on the floor, at the center point of a straight line extending between the two insteps of the subject's feet. See Figure 9, p. 55. The insteps of the feet served as the points of origin of this straight line, and a small plastic ruler was used to estimate its center point. This particular technique for indicating the subject's 'selected' point of interception was adopted because it seemed to provide the best possible estimate of the center point of the subject's total body position.

FIGURE 9. METHOD USED TO ASSESS SPATIAL POSITION ASSUMED BY SUBJECTS WHEN JUDGING MOVING OBJECTS



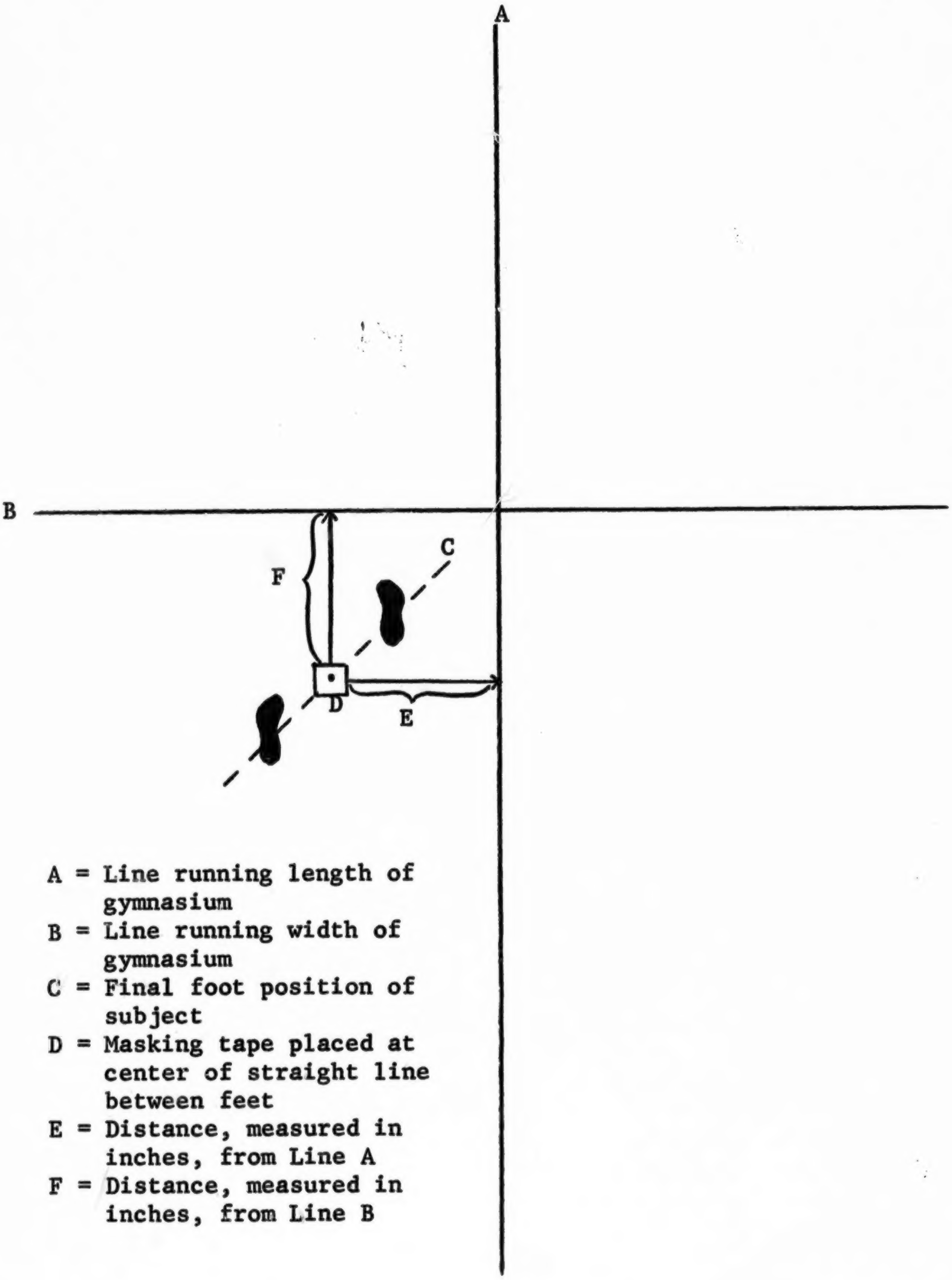
A,B,C = Various Foot Positions Assumed by Subjects

1 = Final Foot Position of Subject
2 = Straight Line Between the Two Feet
3 = Center of Line and Point At Which Masking Tape Was Placed on Floor
D = Masking Tape, Marked With Subject and Trial Numbers

Initial Assessment of the Accuracy of the Spatial Judgments. Subject and trial numbers were marked in indelible ink on the masking tape. A large black dot, placed in the center of each individual piece of masking tape, was used as a reference point for all measurements taken on a given spatial judgment. (See Figure 9-D, above.) Once the subject had completed his total series of trials, the distance from this black dot to the center of two lines, one running the length, the other the width of the gymnasium was measured. Distances were measured to the nearest inch. (See Figure 10, p. 56)

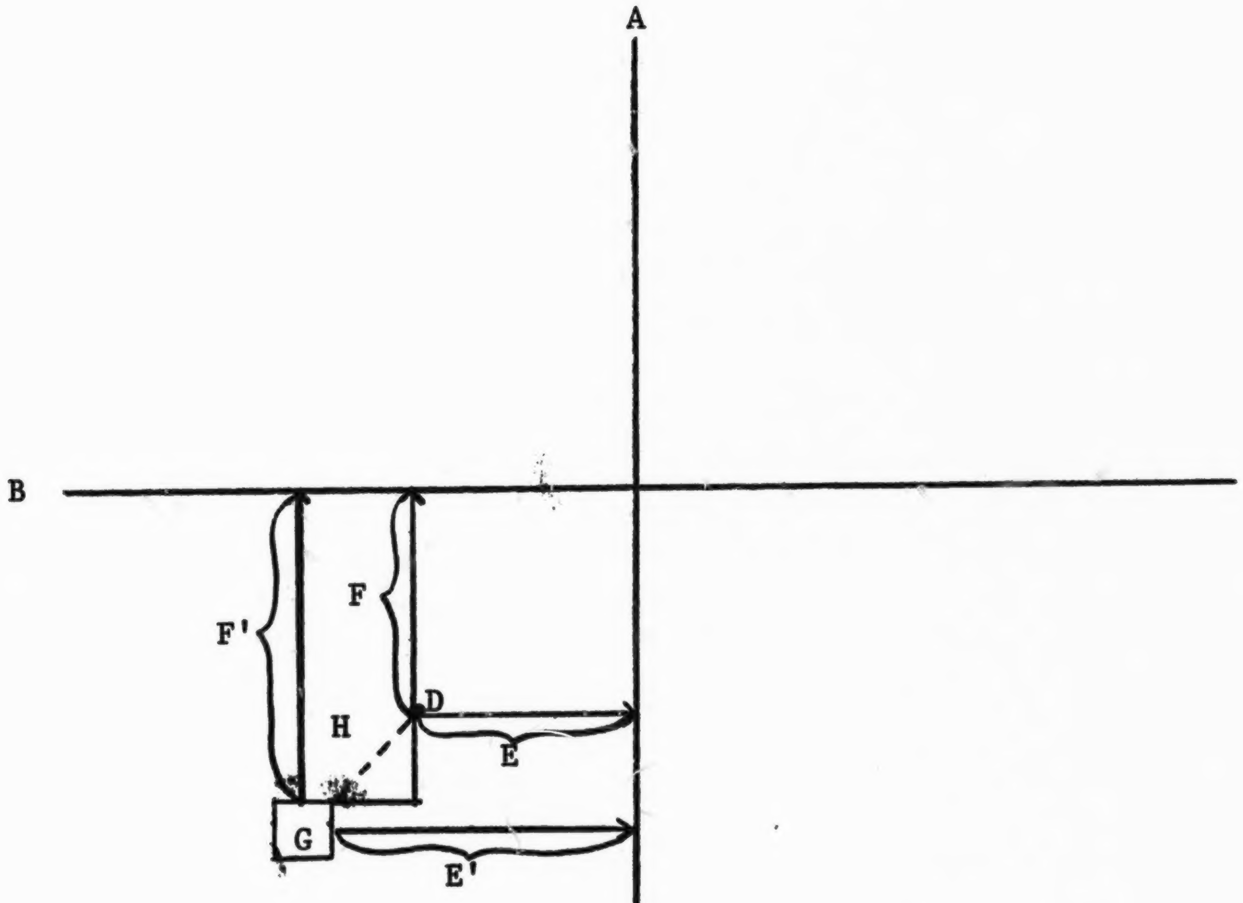
Raw scores thus obtained were later converted to deviation scores by a procedure shown schematically in Figure 11, p. 57. Initially, the distance, in inches, of each optimum area of interception from the two reference lines

FIGURE 10. METHOD USED TO MEASURE SPATIAL JUDGMENTS OF SUBJECTS

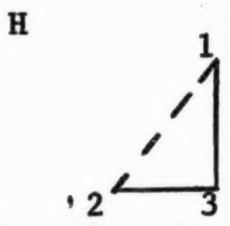


A = Line running length of gymnasium
B = Line running width of gymnasium
C = Final foot position of subject
D = Masking tape placed at center of straight line between feet
E = Distance, measured in inches, from Line A
F = Distance, measured in inches, from Line B

FIGURE 11. METHOD USED TO MEASURE SPATIAL JUDGMENTS OF SUBJECTS (CONT'D)



A = Vertical reference line
B = Horizontal reference line
D = Subject's stopping point
G = Optimum Area of Interception
E'= Distance, in inches, of Optimum Area of Interception from Line A
E'-E = Lateral (right-left) error
F'= Distance, in inches, of Optimum Area of Interception from Line B
F'-F = Distance (depth) error
H = Radial (absolute) error



23 = E' - E or lateral error
13 = F' - F or distance error
12 = H or radial error

previously described was determined. Next, the raw score values previously obtained were subtracted from the appropriate values determined above. This provided a set of distance and lateral deviation scores. The Pythagorean Theorum ($A^2 = B^2 + C^2$), where $B^2$ = distance deviation$^2$, $C^2$ = the lateral deviation$^2$ and $A^2$ = radial error$^2$ was employed to derive a set of absolute or radial error scores.

Reliability of the Performance Measures. A preliminary investigation was undertaken to assess the reliability of each of the performance measures to be used in the study. These measures included reaction time, movement time, lateral deviation, and distance deviation. Twenty college freshmen men served as subjects for this investigation. Each subject was given three trials per condition, 36 trials in all. An analysis of variance was employed to estimate the reliability of each of the measures for each of the twelve treatment conditions. The Spearman-Brown prophecy formula, $r' = \frac{2r}{1 + r}$, was used to predict the number of trials necessary to reach a minimum reliability of .80. The reliability coefficients and the projected number of trials required to reach the standard reliability criterion of .80 are shown in Table 8, p.59.

With the exception of the lateral deviation measures (in particular those at the slow speed of object projection), the projected reliabilities of the majority of the performance measures reached and/or surpassed the criterion standard of .80 in six, seven, or eight trials. Reliabilities were then predicted for the various performance measures with the number of trials set at eight. These are shown in Table 9, p. 60.

TABLE 8. RELIABILITY ESTIMATES AND NUMBER OF TRIALS REQUIRED TO OBTAIN A PROJECTED RELIABILITY OF .80

| TREATMENT CONDITION | REACTION TIME | | MOVEMENT TIME | | DISTANCE DEVIATION | | LATERAL DEVIATION | |
|---|---|---|---|---|---|---|---|---|
| Hor Vert Speed-Dir-Dir | r(3T) | Trials to .80 | r(3T) | Trials to .80 | r(3T) | Trials to .80 | r(3T) | Trials to .80 |
| Fast-Right-High | .698 | 6 | .712 | 6 | .788 | 5 | .413 | 8 |
| Fast-Center-High | .405 | 8 | .655 | 6 | .507 | 8 | .504 | 8 |
| Fast-Left-High | .298 | 11 | .696 | 6 | .634 | 6 | .273 | 11 |
| Fast-Right-Low | .762 | 6 | .459 | 8 | .683 | 6 | .421 | 8 |
| Fast-Center-Low | .444 | 8 | .383 | 9 | .763 | 6 | .093 | 28 |
| Fast-Left-Low | .691 | 6 | .339 | 9 | .679 | 6 | .449 | 8 |
| Slow-Right-High | .505 | 8 | .654 | 6 | .522 | 7 | .329 | 10 |
| Slow-Center-High | .214 | 14 | .054 | 47 | .516 | 7 | .186 | 15 |
| Slow-Left-High | .365 | 9 | .563 | 7 | .607 | 7 | .150 | 18 |
| Slow-Right-Low | .653 | 6 | .535 | 7 | .782 | 5 | .266 | 11 |
| Slow-Center-Low | .616 | 6 | .095 | 28 | .519 | 7 | .246 | 12 |
| Slow-Left-Low | .621 | 6 | .517 | 7 | .887 | 3 | .207 | 14 |

TABLE 9. PROJECTED RELIABILITIES WITH A MAXIMUM OF EIGHT TRIALS PER CONDITION

| CONDITION | REACTION TIME | MOVEMENT TIME | DISTANCE DEVIATION | LATERAL DEVIATION |
|---|---|---|---|---|
| F-R-H | 1.000 | 1.000 | 1.000 | .780 |
| F-C-H | .847 | 1.000 | .898 | .895 |
| F-L-H | .613 | 1.000 | 1.000 | .573 |
| F-R-L | 1.000 | .840 | 1.000 | .791 |
| F-C-L | .821 | .739 | 1.000 | .227 |
| F-L-L | 1.000 | .676 | 1.000 | .827 |
| S-R-H | .896 | 1.000 | .916 | .661 |
| S-C-H | .471 | .138 | .909 | .419 |
| S-L-H | .714 | .962 | 1.000 | .348 |
| S-R-L | 1.000 | .931 | 1.000 | .561 |
| S-C-L | 1.000 | .227 | .912 | .527 |
| S-L-L | 1.000 | .909 | 1.000 | .458 |

With the number of trials set at eight, all of the reliabilities for the distance deviation measures were well above the criterion standard of .80. Only one reaction time and two of the movement time measures were completely unacceptable. In the case of the lateral deviation measures, however, more than half did not meet the specified standard set. In terms of practical limitations on the subject's time, interest, and efficiency, it was not feasible to increase the number of trials beyond eight or nine per condition. Since the majority of the performance measures reached or exceeded the criterion standard of .80 with eight trials, the number of trials per condition was set at eight each. Although the lateral deviation measure was, theoretically, not reliable with this number of trials, it was included in the investigation in order that is might be studied in more detail. Reliability coefficients of subject performances in the experiment proper are reported in the Results Section, p. 70

SELECTION OF SUBJECTS. A total of fifty-four (54) subjects participated in the study. Eighteen (18) subjects each were randomly selected from a carefully defined population of male students enrolled in junior high school, senior high school and college. The average age of each of these groups was: junior high - 12 years; senior high - 16 years; and college - 20 years. Of the eighteen subjects selected from each age group, nine were classified as skilled and nine as unskilled.

General Procedures.

A. Junior and Senior High School Population. Initial contact was made with the Junior and Senior high school students during their regularly scheduled physical education class period. At this time, a total of 175 senior high and 150 junior high male students filled out an 'Experience Questionnaire', indicating in detail the amount of baseball experience each had had prior to that time. (For a detailed description of this questionnaire, see Appendix, p. 137.) On the basis of the responses to this questionnaire form, students were divided into two groups: (a) varsity or experienced baseball players and (b) individuals with little or no baseball experience. Forty (40) subjects were then randomly selected from each of the two major skill classifications. A total of 80 subjects from each of the junior high and high school age populations were thus selected and subsequently given the following tests: (a) the overarm throw for velocity, (b) the Snellen Test for visual acuity and (c) the Depth Perception Apparatus test. (For a description of this test, see Appendix A, p. 133.)

B. College Population. The skilled segment of the college age population was secured through the varsity baseball coach at the University of Toledo. The coach was contacted in the fall, the nature and purpose of the experiment explained to him, and his consent to have members of the varsity baseball team participate in the experiment obtained. The Overarm Throw for Velocity, visual acuity and depth perception measures were taken on all members of the varsity baseball team during subsequent weekend baseball practices. The final sample of college-age-skilled subjects were randomly drawn from the varsity baseball population.

For the unskilled segment, 150 students enrolled in six (6) different sections of the General College Physical Education Program at the University of Toledo were contacted and given the 'Experience Questionnaire'. On the basis of the responses to this questionnaire, the sixty (60) subjects with the least amount of baseball experience were selected and later given the Overarm Throw for Velocity, visual acuity and depth perception tests. (See Appendix, p.133-135)

Criteria for Skill Classifications. Assignment to a particular skill classification was based upon a double criterion.

A. Primary Criterion. The primary criterion used for classifying subjects as skilled or unskilled was an 'experience' factor which was defined as follows:

1. Skilled Classification.

a. High School and College Age Groups. Subjects assigned to this skill classification were those individuals who were presently involved in interscholastic or intercollegiate baseball competition and who had been a member of the varsity baseball squad at their respective institutions for at least one year prior to the school year, 1966-1967. Pitchers and catchers were automatically eliminated from the active subject population since these positions do not ordinarily involve the judging of fly balls.

b. Junior High Age Group. Only those junior high boys who had had a minimum of three years of experience in organized Little League and/or Babe Ruth League baseball competition were classified as skilled individuals.

2. Unskilled Classification.

a. High School and College Age Groups. Subjects assigned to this 'unskilled' group were individuals who were not presently involved in interscholastic or intercollegiate baseball competition and who were not presently or ever had been a member of a varsity baseball squad.

b. Junior High Age Group. Individuals in this category were those junior high school males who were not presently involved in and who had never had experience in organized Little League and/or Babe Ruth League baseball competition.

B. Secondary Criterion. The secondary criterion for classifying individuals as skilled or unskilled was a performance measure, the Overarm Throw for Velocity. The overarm throw for velocity is of course not a perfect indicator of skill in the game of baseball. Most baseball experts will agree, however, that the ability to throw an accurate and well-timed ball from (or to) various locations on the playing field is an important part of the overall game of baseball. Thus individuals who cannot or do not throw well are not likely to become or remain members of organized or competitive baseball groups. (This measure was employed primarily to provide some quantitative basis for identifying the two levels of skill and to aid in more clearly identifiying those individuals in the 'unskilled' category.)

1. Skilled Classification. The skill classification for each age group consisted of those individuals whose scores were included in the top 25% of a distribution of scores based upon performances on the Overarm Throw for Velocity test.

2. Unskilled Classification. The unskilled classification for all age groups consisted of those individuals whose scores on the Overarm Throw for Velocity test fell in the bottom 25% of a distribution based upon performances on that test.

Criterion for Visual Acuity and Depth Perception Performance. Only those individuals having a minimum visual acuity of 20/25 in each eye were considered in the final selection of subjects. Since no standard norms were available by which performances on the Depth Perception Apparatus test could be judged, a Two-Way Analysis of Variance was used to determine if significant differences existed between subject groups selected for participation in the experiment in terms of depth perception.

Final Selection of Subjects. Distributions, based on the mean performance scores on the Overarm Throw for Velocity test, were made for each of the subject populations. Individuals whose scores fell in the upper and lower 25% of these distributions were identified and evaluated in terms of amount of baseball experience and visual acuity rating. Using the maximum requirements for baseball experience and performance on the Overarm Throw for Velocity and visual acuity tests previously outlined, a tentative selection of subjects was made. A Two-Way Analysis of Variance was then run on the scores on the Depth Perception Apparatus test to determine if any significant differences existed between the various age and/or skill groups selected. Results of this analysis, shown in Table 10, p. 65, indicated that there were no significant differences between the various groups in terms of depth perception performances.

Eighteen subjects from each of the junior high, senior high, and college age groups were contacted and asked to participate in the experiment. They were scheduled for a specific day and hour for testing.

TABLE 10. ANALYSIS OF VARIANCE: DEPTH PERCEPTION PERFORMANCE BY AGE AND SKILL

| SOURCE OF VARIATION | SUM OF SQUARES | df | MEAN SQUARE | F |
|---|---|---|---|---|
| Skill | .010 | 1 | .010 | <1 |
| Age | .043 | 2 | .022 | <1 |
| Skill X Age | .167 | 2 | .084 | <1 |
| Within | 66.840 | 48 | 1.390 | |
| Total | 67.060 | 53 | | |

COLLECTION OF THE DATA. Data were collected over a three-month period, beginning in February, 1967, and ending in April, 1967. All testing sessions were conducted in the University of Toledo Fieldhouse, Toledo, Ohio. All subjects were exposed to all twelve combinations of the speed, horizontal and vertical angles of object projection selected previously. Each subject received eight trials per condition or a total of 96 trials in all. Each series of trials was presented in a predetermined random order. (See Appendix B, p.140-154.)

Testors for the project were graduate and undergraduate majors in physical education at the University of Toledo; two undergraduate engineering majors also enrolled at the University of Toledo, and two faculty members of the Department of Physical Education at Bowling Green State University, Bowling Green, Ohio.

Two days prior to the initial data collection session, a special two-hour training session was held in the University Fieldhouse. During this training period, testors were assigned to and trained in their respective tasks. At the completion of the instructional period, two trial runs of the experiment were carried out in order to assure that each testor clearly understood his responsibilities and to clarify any questions which might have arisen about the experimental set-up in general.

Analysis of the Data. The design of the present study may be described as a five-dimensional factorial design with repeated measures on three dimensions. Since several performance indices were involved in the evaluation of the visuo-perceptual performance under investigation, multivariate statistical techniques were directly applicable to the present problem (58,84,86). Of the several multivariate statistical techniques which have been developed recently, Multivariate Analysis of Variance (MANOVA) procedures were selected as most appropriate for the data analysis.

The MANOVA technique has the distinguishing characteristic of combining the outstanding features of both univariate analysis of variance and multiple discriminant analysis techniques into a single analysis (58). More specifically the MANOVA employs the feature of the univariate ANOVA which permits the assessment of the effects of various experimental conditions upon a given behavior or performance and the feature of the multiple discriminant analysis which permits multiple performance measures to be handled in a single analysis.

Unfortunately, at present, most MANOVA programs are relatively undeveloped and thus are, for the most part, limited in terms of use in analyzing any except the simplest multivariate designs. In the case of the present study, the design was too large to be handled appropriately by available MANOVA techniques. Therefore, as an alternative approach, a series of five univariate analyses, using a single performance index per analysis, was employed. These analyses permitted an assessment of the effects, based upon a single behavioral index, of the five main variables of skill, age, speed, vertical and horizontal direction of object flight upon visuo-perceptual performances. Where appropriate, Scheffe's Multiple Comparisons Test was used to compare differences between group means (111).

# CHAPTER V

# RESULTS

The results of the study are divided into the following sections: (a) Selection of the Level of Significance; (b) Reliability of the Performance Measures; (c) Speed of the Perceptual Response (reaction time); (d) Spatial Accuracy of the Perceptual Response, including distance, lateral and radial deviation analyses; (e) Movement Time; and (f) Summary of the results. Where appropriate, the discussion of results is divided into two main categories: that based upon group characteristics (age and skill) and that based upon stimulus characteristics of the flight of the moving object (speed, horizontal and vertical direction).

## SELECTION OF THE LEVEL OF SIGNIFICANCE

Separate univariate analyses of variance were run on each of the reaction time, movement time, and spatial accuracy measures (a total of five analyses). Where appropriate, Scheffe's Multiple Comparisons Test was used to evaluate differences between means. The univariate analyses run and the error terms used were based upon a multi-factor, repeated measurements design suggested by Winer (111). The level of significance for evaluating the F-tests and comparisons among means was set at Alpha .01.

No absolute standards are available to guide an experimenter in selecting a particular level of significance for evaluating the evidence from a given investigation. However, in any multi-factor experiment where several F-tests are obtained, there is always the very serious problem that as the number of F-tests obtained increases, the probability of obtaining one or more spuriously significant results increases as well. In addition, when multiple F-tests are run on data which are not independent, the number of spuriously significant F-tests to be expected by chance is indeed difficult if not impossible to establish (111). The present analyses involved the obtaining of a large number of F-ratios (31 per analysis, 155 in all) on data which were not independent. Therefore, in an effort to minimize the problem of increasing numbers of spuriously significant F-ratios, the one percent level of significance (Alpha .01) was decided upon. It is obvious of course that regardless of the level of significance set, the "evidence provided by a single experiment with respect to the truth or falsity of a statistical hypothesis is seldom complete enough to arrive at a decision which is free of all possible error" (111, p.13).

## RELIABILITY OF THE PERFORMANCE MEASURES

Two-Way Analyses of Variance were used to determine the reliability of each of the performance measures. Since differences in skill were, in all cases except one (Movement Time), significant, separate reliabilities were calculated for each of the two skill groups involved in the experiment. These reliability coefficients, grouped according to experimental condition and skill level, are shown in Table 11, p. 70.

With the exception of the Lateral Deviation measure, reliability coefficients for each of the other performance measures (by experimental condition) met or closely approached the criterion standard of .80 originally set. The somewhat lower reliabilities found across all experimental conditions for the Lateral Deviation measure of course raises the question of the meaningfulness of any conclusions based upon the analysis of this performance measure.

## SPEED OF THE PERCEPTUAL JUDGMENT. (Reaction Time)

Results of the analysis of the reaction time are shown in Table 12, p. 71.

TABLE 11. RELIABILITY OF PERFORMANCE MEASURES

| CONDITION | REACTION TIME Skilled | REACTION TIME Unskilled | MOVEMENT TIME |
|---|---|---|---|
| Slow-Right-Low | .906 | .900 | .773 |
| Slow-Right-High | .895 | .829 | .862 |
| Slow-Center-Low | .788 | .783 | .845 |
| Slow-Center-High | .772 | .759 | .870 |
| Slow-Left-Low | .801 | .767 | .853 |
| Slow-Left-High | .860 | .803 | .858 |
| Fast-Right-Low | .905 | .916 | .836 |
| Fast-Right-High | .828 | .891 | .886 |
| Fast-Center-Low | .833 | .782 | .867 |
| Fast-Center-High | .855 | .774 | .833 |
| Fast-Left-Low | .677 | .604 | .793 |
| Fast-Left-High | .741 | .692 | .864 |

|  | LATERAL DEVIATION |  | DISTANCE DEVIATION |  | RADIAL DEVIATION |  |
|---|---|---|---|---|---|---|
| CONDITION | Skilled | Unskilled | Skilled | Unskilled | Skilled | Unskilled |
| Slow-Right-Low | .496 | .373 | .677 | .863 | .654 | .850 |
| Slow-Right-High | .622 | .684 | .828 | .843 | .822 | .832 |
| Slow-Center-Low | .377 | .000 | .533 | .795 | .743 | .453 |
| Slow-Center-High | .042 | .357 | .784 | .808 | .808 | .777 |
| Slow-Left-Low | .599 | .696 | .725 | .898 | .698 | .902 |
| Slow-Left-High | .595 | .598 | .818 | .761 | .813 | .756 |
| Fast-Right-Low | .748 | .807 | .814 | .856 | .829 | .865 |
| Fast-Right-High | .647 | .642 | .700 | .865 | .681 | .868 |
| Fast-Center-Low | .309 | .280 | .861 | .831 | .825 | .828 |
| Fast-Center-High | .708 | .486 | .820 | .787 | .810 | .776 |
| Fast-Left-Low | .722 | .698 | .893 | .904 | .885 | .907 |
| Fast-Left-High | .630 | .330 | .723 | .865 | .744 | .860 |

Group Characteristics. As can be seen in Table 12, the main effect of skill was significant. Figure 12, p. 73 indicates that skilled individuals responded significantly more rapidly (.361 seconds) to the moving object in space than did unskilled individuals (.511 seconds). This suggests that the skilled individual made his visuo-perceptual judgment about the flight of the moving object significantly more quickly than did the unskilled person.

TABLE 12. SUMMARY TABLE: ANALYSIS OF VARIANCE - REACTION TIME

| Source of Variation | Sum of Squares | df | Mean Square | F-Test | Critical F-Value (.01) |
|---|---|---|---|---|---|
| Group Characteristics (Between Subjects) | | | | | |
| Age | 3.7450 | 2 | 1.8725 | 2.14 | 5.08 |
| Skill (Sk) | 29.3237 | 1 | 29.3237 | 33.54* | 7.19 |
| Age X Sk | .2779 | 2 | .1389 | .16 | 5.08 |
| Subjects Within Groups | 41.9728 | 48 | .8744 | | |
| Flight Characteristics (Within Subjects) | | | | | |
| Speed (Sp) | 5.6585 | 1 | 5.6585 | 66.96* | 7.19 |
| Age X Sp | .0333 | 2 | .0167 | .197 | 5.08 |
| Sk X Sp | .1170 | 1 | .1170 | 1.38 | 7.19 |
| Age X Sk X Sp | .1495 | 2 | .0747 | .88 | 5.08 |
| Sp X Subjects Within Groups | 4.0569 | 48 | .0845 | | |
| Horizontal Direction | 14.2820 | 2 | 7.1410 | 31.98* | 4.82 |
| Age X HD | .8611 | 4 | .2154 | .96 | 3.51 |
| Sk X HD | 1.1316 | 2 | .5685 | 2.545 | 4.82 |
| Age X Sk X HD | .8830 | 4 | .2207 | .988 | 3.51 |
| HD X Subjects Within Groups | 21.4347 | 96 | .2233 | | |
| Vertical Direction | .1275 | 1 | .1275 | 3.11 | 7.19 |
| Age X VD | .0442 | 2 | .0221 | .54 | 5.08 |
| Sk X VD | .0503 | 1 | .0503 | 1.23 | 7.19 |
| Age X Sk X VD | .0798 | 2 | .0399 | .97 | 5.08 |
| VD X Subjects Within Groups | 1.9659 | 48 | .0410 | | |
| Sp X HD | .1429 | 2 | .0715 | 1.20 | 4.82 |
| Age X Sp X HD | .1921 | 4 | .0480 | .81 | 3.51 |
| Sk X Sp X HD | .4690 | 2 | .2345 | 3.95 | 4.82 |
| Age X Sk X Sp X HD | .3520 | 4 | .0880 | 1.48 | 3.51 |
| Sp X HD X Subjects Within Groups | 5.7003 | 96 | .0594 | | |
| Sp X VD | .2419 | 1 | .2419 | 6.20 | 7.19 |
| Age X Sp X VD | .0219 | 2 | .0110 | .28 | 5.08 |
| Sk X Sp X VD | .0010 | 1 | .0010 | .03 | 7.19 |
| Age X Sk X Sp X VD | .0801 | 2 | .0401 | 1.03 | 5.08 |
| Sp X VD X Subjects Within Groups | 1.8710 | 48 | .0390 | | |

TABLE 12. SUMMARY TABLE: ANALYSIS OF VARIANCE - REACTION TIME (CONT'D)

| Source of Variation | Sum of Squares | df | Mean Square | F-Test | Critical F-Value (.01) |
|---|---|---|---|---|---|
| HD X VD | .3770 | 2 | .1885 | 3.81 | 4.82 |
| Age X HD X VD | .1944 | 4 | .0486 | .98 | 3.51 |
| Sk X HD X VD | .0252 | 2 | .0126 | .25 | 4.82 |
| Sk X AGE X HD X VD | .0725 | 4 | .0181 | .36 | 3.51 |
| HD X VD X Subjects Within Groups | 4.7852 | 96 | .0498 | | |
| Sp X HD X VD | .1794 | 2 | .0897 | 2.398 | 4.82 |
| Age X Sp X HD X VD | .1335 | 4 | .0334 | .89 | 3.51 |
| Sk X Sp X HD X VD | .0228 | 2 | .0114 | .30 | 4.82 |
| Age X Sk X Sp X HD X VD | .0294 | 4 | .0074 | .198 | 3.51 |
| Sp X HD X VD X Subjects Within Groups | 3.5867 | 96 | .0374 | | |

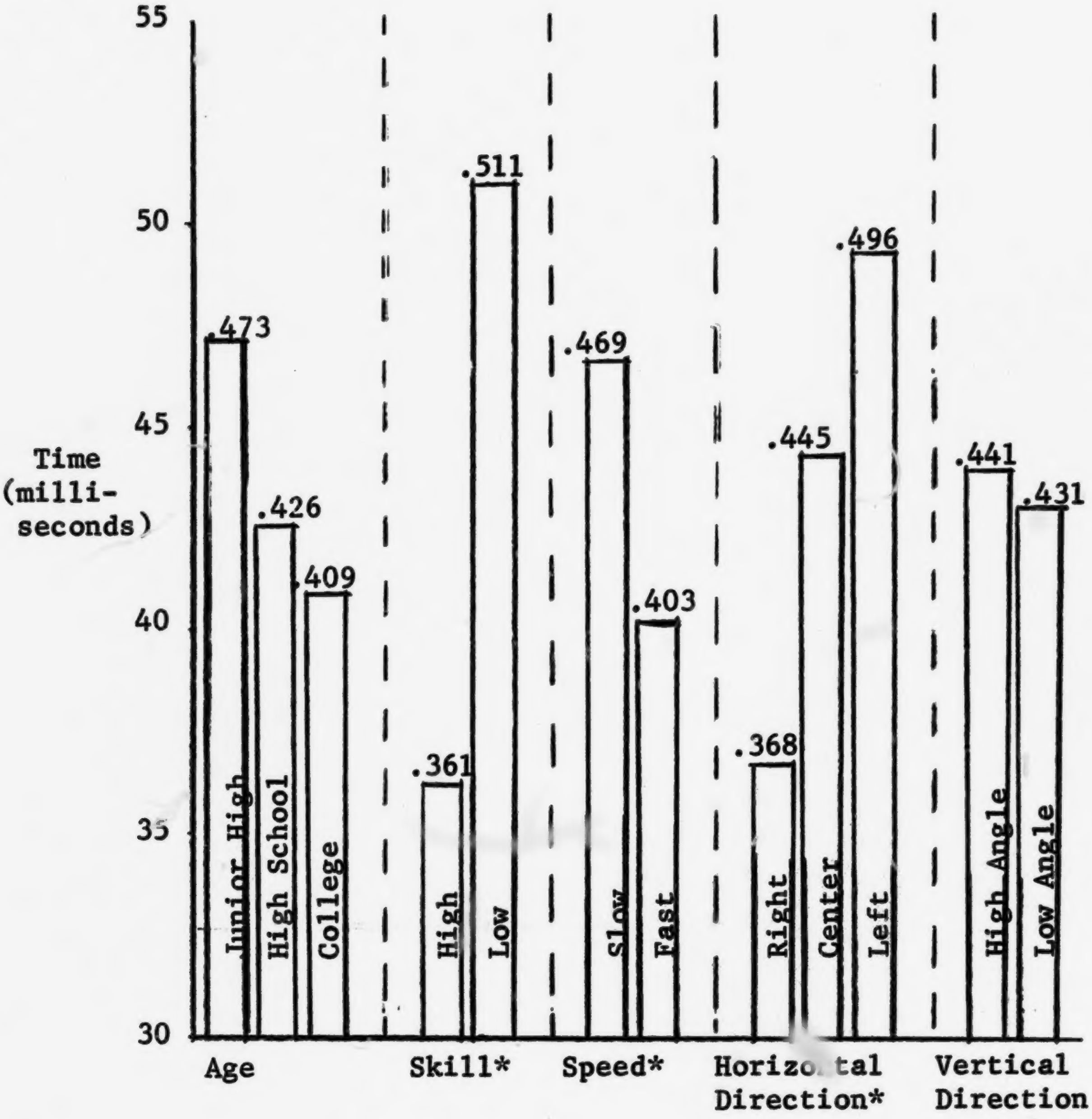
*Significant at .01 level.

The main effect of age was not significant. Thus, although perceptual responses did tend to be faster in the older age groups, physical maturity (as represented by age) did not, in general, significantly affect the speed with which the individual judged the flight of the moving object in space.

Stimulus Characteristics of the Moving Object. Stimulus characteristics of the moving object included speed, horizontal direction and vertical direction of object flight. As indicated in Table 12, the Speed of object projection significantly affected the rapidity with which the perceptual judgment was made. Objects traveling at a faster rate of speed (49 feet/second) were responded to significantly more quickly (.403 seconds) than were objects moving at a slower rate of speed (.469 seconds). See Figure 12, p. 73.

The main effect of Horizontal Direction was also significant. Figure 12 indicates that, in general, individuals reacted significantly more quickly

FIGURE 12. SPEED OF VISUO-PERCEPTUAL RESPONSES ACCORDING TO GROUP AND STIMULUS CHARACTERISTICS (REACTION TIME)



* Significant at .01

to objects moving to the right (horizontal angle - 5°) than to objects moving either to the left (5°) or directly at them (horizontal angle - 0°). See Table 13 for results of Scheffe's Multiple Comparison's Test.

The Vertical Direction of object flight had no significant effect upon the speed of the perceptual response to the moving object in space.

TABLE 13. SPEED OF THE PERCEPTUAL JUDGMENT: COMPARISON OF MEANS (REACTION TIME)*

| HORIZONTAL DIRECTION | | |
|---|---|---|
| RIGHT | CENTER | LEFT |
| .368 | .445 | .496 |

*Since all possible mean comparisons were not made, lines connect only those means which were compared. Solid lines indicate significance; broken lines indicate no significance.

## ACCURACY OF THE VISUO-PERCEPTUAL JUDGMENT

Distance Deviation. The results of the analysis of distance deviations or depth errors made by the subject in judging the flight of the moving object are shown in Table 14, p. 75.

Group Characteristics. As can be seen in Table 14, the main effect of skill was significant. Figure 13, p. 77 shows clearly that skilled individuals were more than twice as accurate as unskilled individuals in judging the flight of the moving object in space.

The main effect of age was not significant. (See Table 14) Again the age of the individual apparently had no effect upon the accuracy of his

TABLE 14 . SUMMARY TABLE: ANALYSIS OF VARIANCE - DISTANCE DEVIATION

| Source of Variation | Sum of Squares | df | Mean Square | F-Test | Critical F-Value (.01) |
|---|---|---|---|---|---|
| Group Characteristics (Between Subjects) | | | | | |
| Age | 74,571.43 | 2 | 37,285.71 | 1.91 | 5.08 |
| Skill (Sk) | 1,026,309.70 | 1 | 1,026,309.70 | 52.52* | 7.19 |
| Age X Sk | 96,326.15 | 2 | 48,163.08 | 2.46 | 5.08 |
| Subjects Within Groups | 938,014.74 | 48 | 19,541.97 | | |
| Flight Characteristics (Within Subjects) | | | | | |
| Speed (Sp) | .141 | 1 | .141 | - | 7.19 |
| Age X Sp | 34,294.04 | 2 | 17,147.02 | .41 | 5.08 |
| Sk X Sp | 9,787.26 | 1 | 9,787.26 | .23 | 7.19 |
| Age X Sk X Sp | 21,269.94 | 2 | 10,634.97 | .25 | 5.08 |
| Sp X Subjects Within Groups | 2,006,798.70 | 48 | 41,808.31 | | |
| Horizontal Direction | 20,545.38 | 2 | 10,272.69 | 7.11* | 4.82 |
| Age X HD | 3,225.62 | 4 | 806.40 | .56 | 3.51 |
| Sk X HD | 10,243.46 | 2 | 5,121.73 | 3.55 | 4.82 |
| Age X Sk X HD | 2,995.45 | 4 | 748.86 | .52 | 3.51 |
| HD X Subjects Within Groups | 138,624.72 | 96 | 1,444.01 | | |
| Vertical Direction | 43,803.00 | 1 | 43,803.00 | 7.63* | 7.19 |
| Age X VD | 3,847.14 | 2 | 1,923.57 | .34 | 5.08 |
| Sk X VD | 5,046.92 | 1 | 5,046.92 | .88 | 7.19 |
| Age X Sk X VD | 4,819.73 | 2 | 2,409.86 | .42 | 5.08 |
| VD X Subjects Within Groups | 275,505.16 | 48 | 5,739.69 | | |
| Sp X HD | 26,808.80 | 2 | 13,404.40 | 7.48* | 4.82 |
| Age X Sp X HD | 10,549.46 | 4 | 2,637.36 | 1.47 | 3.51 |
| Sk X Sp X HD | 370.80 | 2 | 185.40 | .10 | 4.82 |
| Age X Sk X sp X HD | 3,483.43 | 4 | 870.86 | .49 | 3.51 |
| Sp X HD X Subjects Within Groups | 171,923.59 | 96 | 1,790.87 | | |
| Sp X VD | 437,196.46 | 1 | 437,196.46 | 126.52* | 7.19 |
| Age X Sp X VD | 36,009.31 | 2 | 18,004.66 | 5.21* | 5.08 |
| Sk X Sp X VD | 94,616.05 | 1 | 94,616.05 | 27.38* | 7.19 |
| Age X Sk X Sp X VD | 12,942.00 | 2 | 6,471.00 | 1.87 | 5.08 |
| Sp X VD X Subjects Within Groups | 165,855.13 | 48 | 3,455.32 | | |

TABLE 14. SUMMARY TABLE: ANALYSIS OF VARIANCE - DISTANCE DEVIATION (CONT'D)

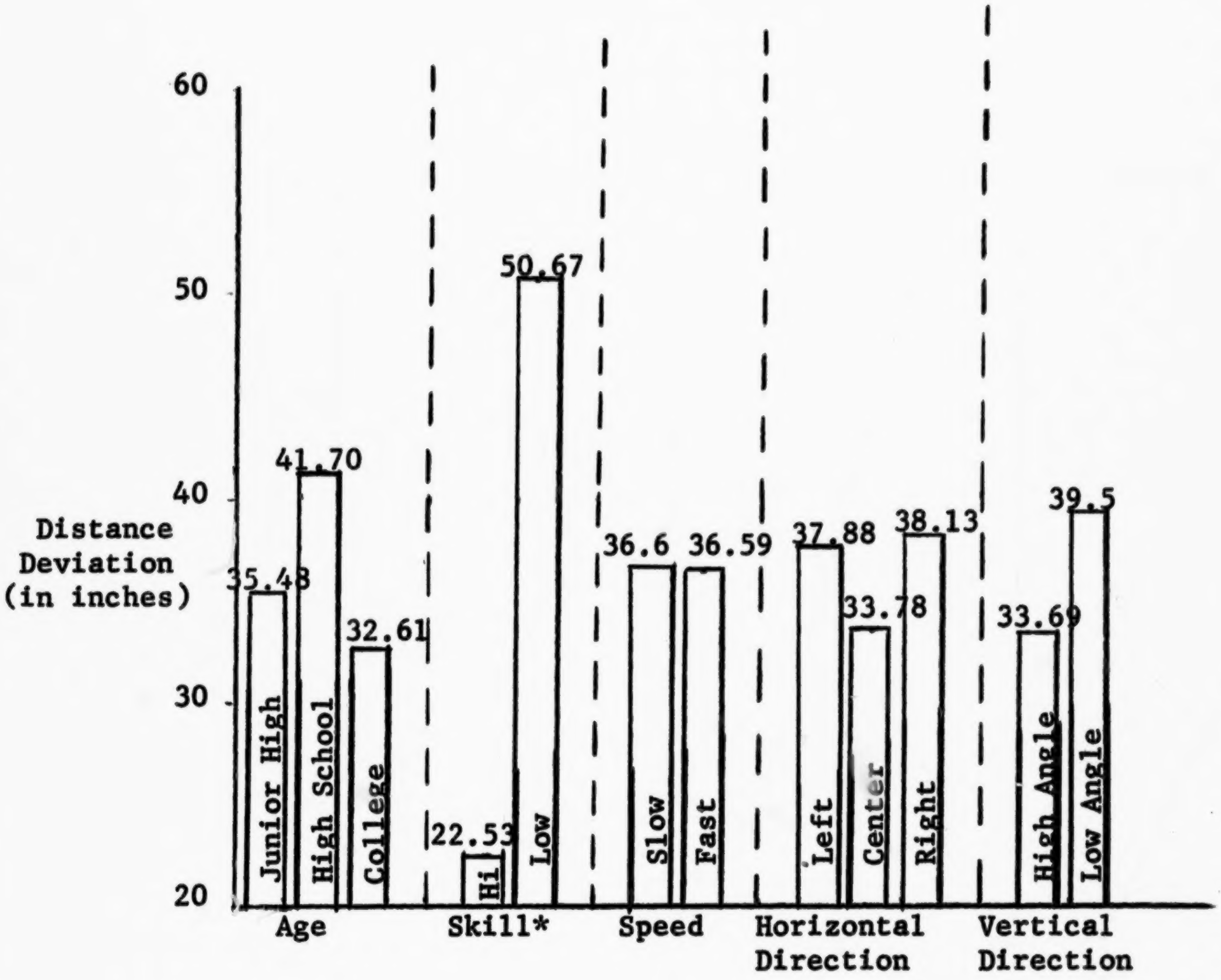
| Source of Variation | Sum of Squares | df | Mean Square | F-Test | Critical F-Value (.01) |
|---|---|---|---|---|---|
| HD X VD | 38,955.47 | 2 | 19,477.74 | 15.02* | 4.82 |
| Age X HD X VD | 2,419.30 | 4 | 604.82 | .47 | 3.51 |
| Sk X HD X VD | 1,777.74 | 2 | 888.87 | .685 | 4.82 |
| Sk X Age X HD X VD | 1,447.43 | 4 | 361.86 | .279 | 3.51 |
| HD X VD Subjects Within Groups | 124,481.26 | 96 | 1,296.68 | | |
| Sp X HD X VD | 4,577.75 | 2 | 2,288.88 | 2.17 | 4.82 |
| Age X Sp X HD X VD | 184.25 | 4 | 46.06 | .04 | 3.51 |
| Sk X Sp X HD X VD | 2,866.23 | 2 | 1,433.11 | 1.36 | 4.82 |
| Age X Sk X Sp X HD X VD | 8,970.09 | 4 | 2,242.52 | 2.13 | 3.51 |
| Sp X HD X VD X Subjects Within Groups | 101,149.76 | 96 | 1,053.64 | | |

*Significant at the .01 level.

visuo-perceptual response. A significant interaction between Age X Speed X Vertical Direction of object flight indicated, however, that the age of the individual may have become important when particular combinations of speed and vertical direction of object flight were being judged. The nature of this interaction is shown in Figure 14, p. 78. A comparison of group means (Table 15, p. 79) indicated that there was a significant difference between high school and college age males in accurately judging the flight of an object projected at a slow speed and a low vertical angle (34°). It should be pointed out that the exact nature of this interaction was not clear and thus no strict interpretation or evaluation of such effects can be made on the basis of the present data.

*Stimulus Characteristics of the Moving Object*. Table 14 indicates that both Horizontal and Vertical Direction of object flight significantly affected the accuracy of the perceptual judgment made by the performer. In terms of horizontal direction, objects moving directly toward the individual (horizontal angle - 0°; 33.78") were judged significantly more accurately than were

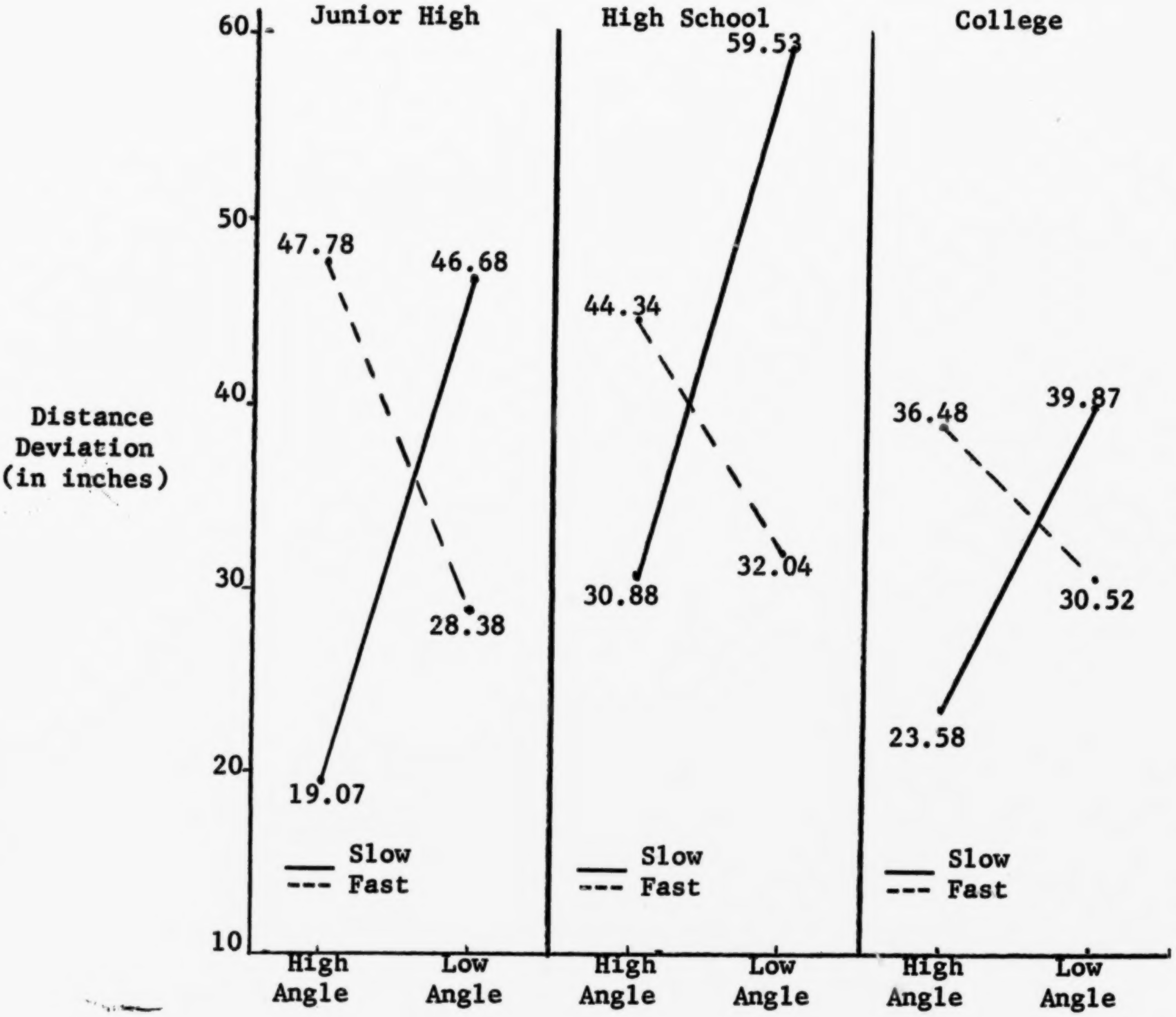
FIGURE 13. ACCURACY OF THE VISUO-PERCEPTUAL JUDGMENTS ACCORDING TO GROUP AND STIMULUS CHARACTERISTICS: DISTANCE DEVIATION



* Significant at .01

those moving to either the right (38.13") or the left (37.88") of the individual. (Figure 13, Table 16, p. 82) With respect to vertical direction of object flight, objects projected at a sharper vertical angle (44°) were judged more accurately (33.69") than those projected at a flatter vertical angle (34°; 39.5"). A significant interaction between Horizontal X Vertical Direction of object flight indicated that specific combinations of these two stimulus characteristics affected the individual's judgment of the flight of the moving object in different ways. Figure 15, p. 79, indicates that an object projected at a vertical angle of 34° was judged equally precisely regardless of the horizontal direction in which it

FIGURE 14 . INTERACTION EFFECT: AGE X SPEED X VERTICAL DIRECTION (DISTANCE DEVIATION IN INCHES)



was moving. Objects projected at a vertical angle of 44°, however, were affected by the horizontal direction of object flight and were judged most accurately when the object was moving directly toward the individual. See Figure 15, p.79.

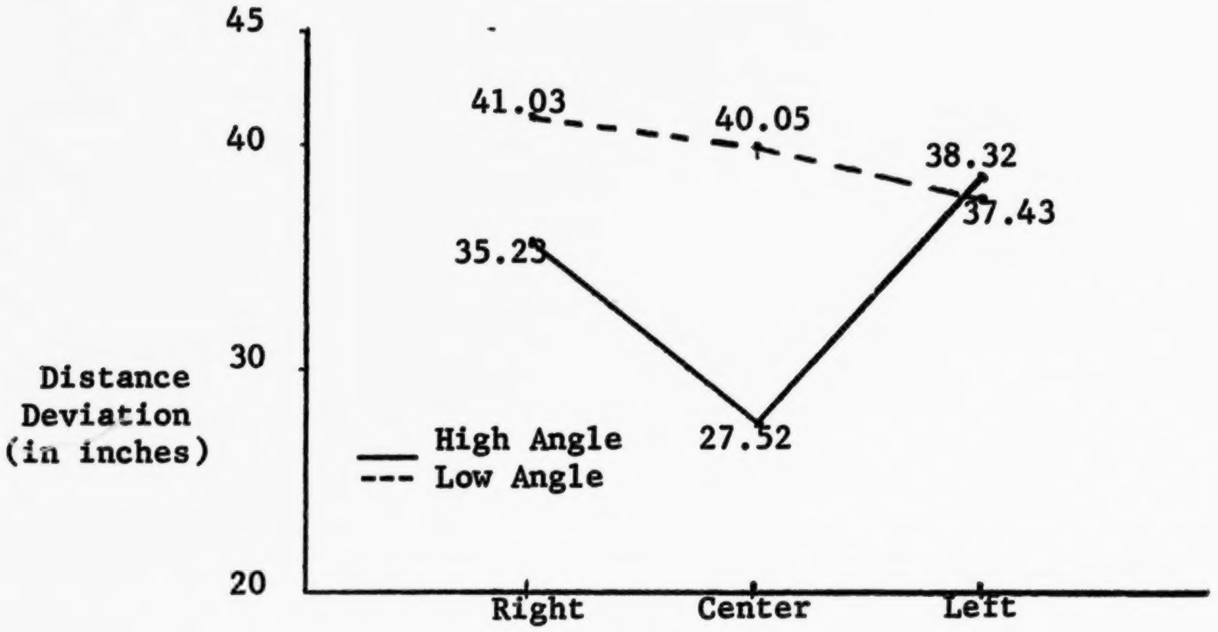
The main effect of speed was not significant, that is, perceptual judgments of objects moving at a fast rate of speed were as accurate as those

TABLE 15. SPATIAL ACCUARACY OF THE VISUO-PERCEPTUAL JUDGMENT: COMPARISON OF MEANS (DISTANCE DEVIATION)*

| AGE X SPEED X VERTICAL DIRECTION | | |
|---|---|---|
| JR-SLO-44° | HI SCH-SLO-44° | COLL-SLO-44° |
| 19.07" | 30.88" | 23.58" |
| JR-SLO-34° | HI SCH-SLO-34° | COLL-SLO-34° |
| 46.68" | 59.53" | 39.87" |
| JR-FAST-44° | HI SCH-FAST-44° | COLL-FAST-44° |
| 47.78" | 44.84" | 36.48" |
| JR-FAST-34° | HI SCH-FAST-34° | COLL-FAST-34° |
| 28.38" | 32.04" | 30.52" |

*Since all possible mean comparisons were not made, lines connect only those means which were compared. Solid lines indicate significance; broken lines indicate no significance.

FIGURE 15. INTERACTION EFFECT: HORIZONTAL X VERTICAL DIRECTION (DISTANCE DEVIATION IN INCHES)



perceptual judgments of objects moving at a slow rate of speed. See Table 14, p. 75. The significant interaction between Speed X Vertical Direction (Figure 16, p. 81) and Speed X Horizontal Direction (Figure 17, p. 81) of object flight indicated that speed, when combined with a given vertical or horizontal direction of object flight, did in fact affect the accuracy of the visuo-perceptual judgment. For example, speed was not important when objects were projected at a horizontal angle of 5°-right or at a horizontal angle of 0°. (See Table 16, p. 82.) Conversely, visuo-perceptual judgments of objects moving horizontally to the left were significantly more accurate when the object was moving at a slow speed than when it was traveling at a fast speed.

In addition, the interaction between Speed X Vertical Direction, shown in Figure 16, indicated that objects projected at a greater vertical angle (44°) were judged more accurately when they were traveling at a slow speed, while those projected at a flatter vertical angle (34°) were judged more accurately when they were traveling at a fast speed. The significant interaction between Skill X Speed X Vertical Direction further suggested that the nature of the effect of speed and vertical direction upon the visuo-perceptual response was also dependent upon the skill level of the individual. See Figure 18, p. 83. When objects were moving at a slow speed, the effect of vertical direction of object flight was the same for both groups. (The skilled were, of course, always more accurate than the unskilled.) When the object was moving at a fast speed, the effect of the vertical direction of object flight depended upon the level of skill of the individual making the response. For the skilled person, the vertical direction of object flight had little or no effect upon the accuracy of the visuo-perceptual judgment. For the unskilled person, however, objects projected at a vertical angle of 34° were judged significantly more accurately than were those projected at a vertical angle of 44°. (See Table 16.)

FIGURE 16. INTERACTION EFFECT: SPEED X VERTICAL DIRECTION (DISTANCE DEVIATION IN INCHES)

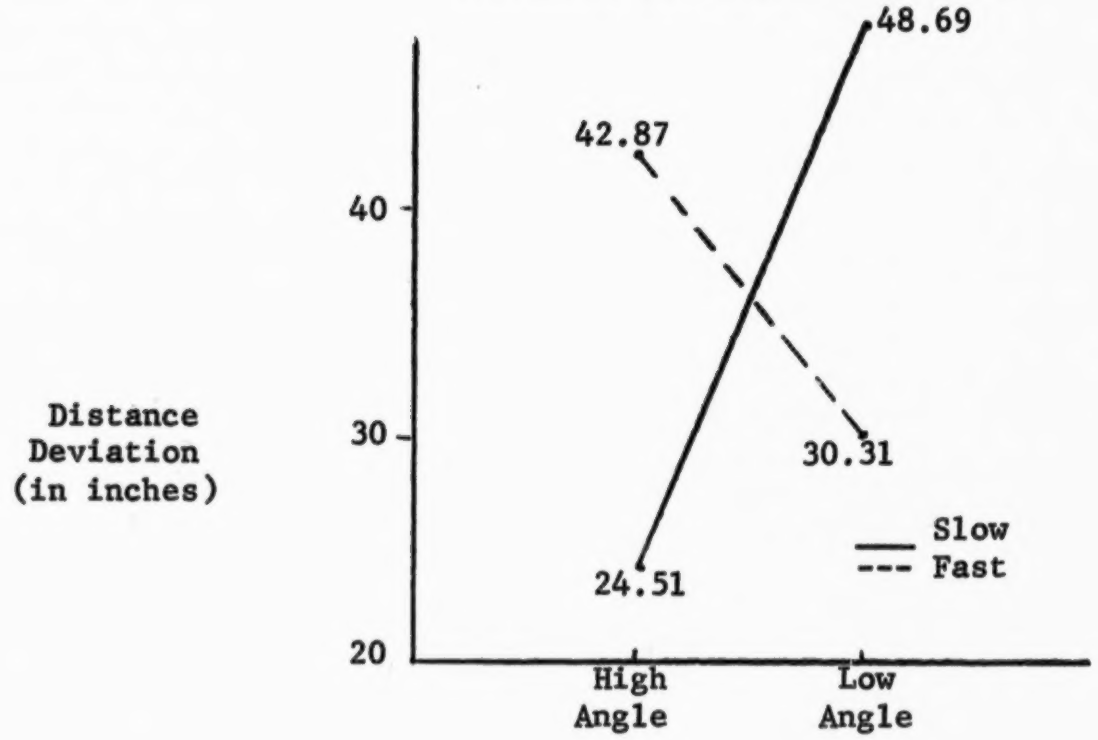


FIGURE 17. INTERACTION EFFECT: SPEED X HORIZONTAL DIRECTION (DISTANCE DEVIATION IN INCHES)

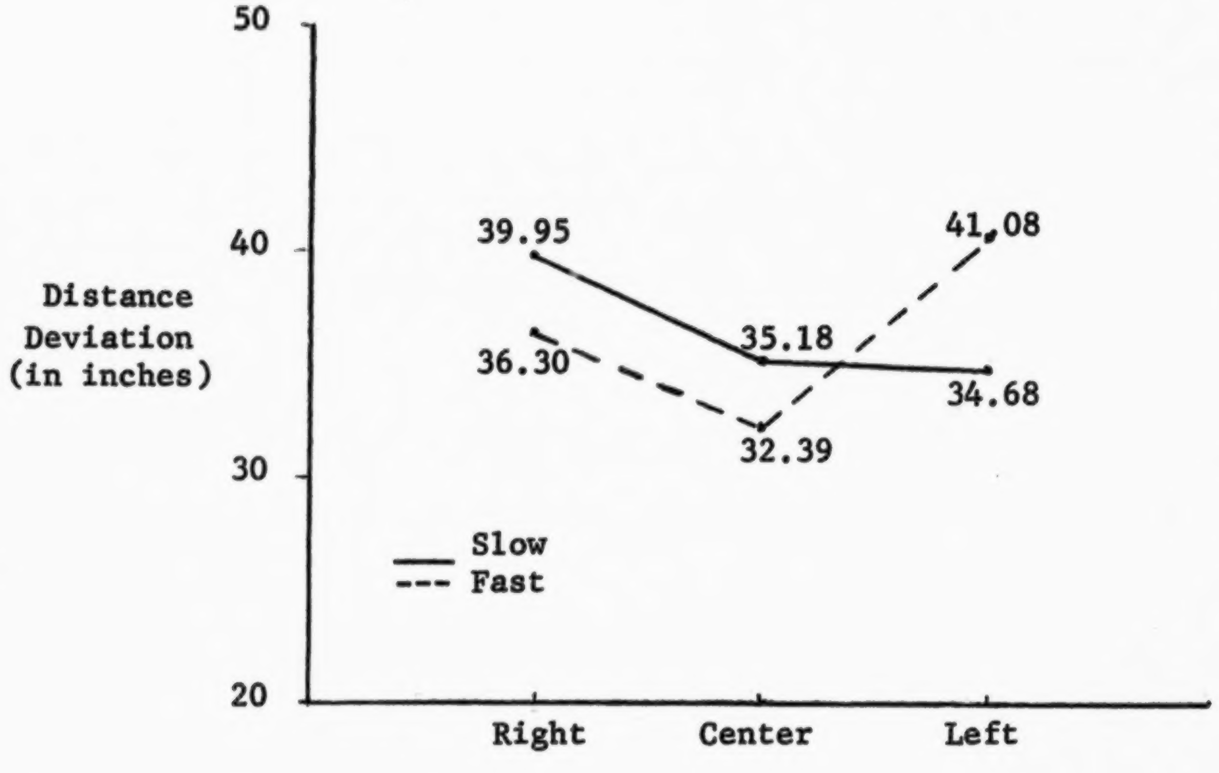


TABLE 16. SPATIAL ACCURACY OF THE VISUO-PERCEPTUAL JUDGMENT: COMPARISON OF MEANS (DISTANCE DEVIATION)*

HORIZONTAL DIRECTION

| RIGHT | CENTER | LEFT |
|---|---|---|
| 38.13" | 33.78" | 37.88" |

HORIZONTAL X VERTICAL DIRECTION

| RT-44° | CTR-44° | LFT-44° | RT-34° | CTR-34° | LFT-34° |
|---|---|---|---|---|---|
| 35.23" | 27.52" | 38.32" | 41.03" | 40.05" | 37.43" |

SPEED X HORIZONTAL DIRECTION

| FST-RT | FST-CTR | FST-LFT | SLO-RT | SLO-CTR | SLO-LFT |
|---|---|---|---|---|---|
| 36.30" | 32.39" | 41.08" | 39.95" | 35.18" | 34.68" |

SPEED X VERTICAL DIRECTION

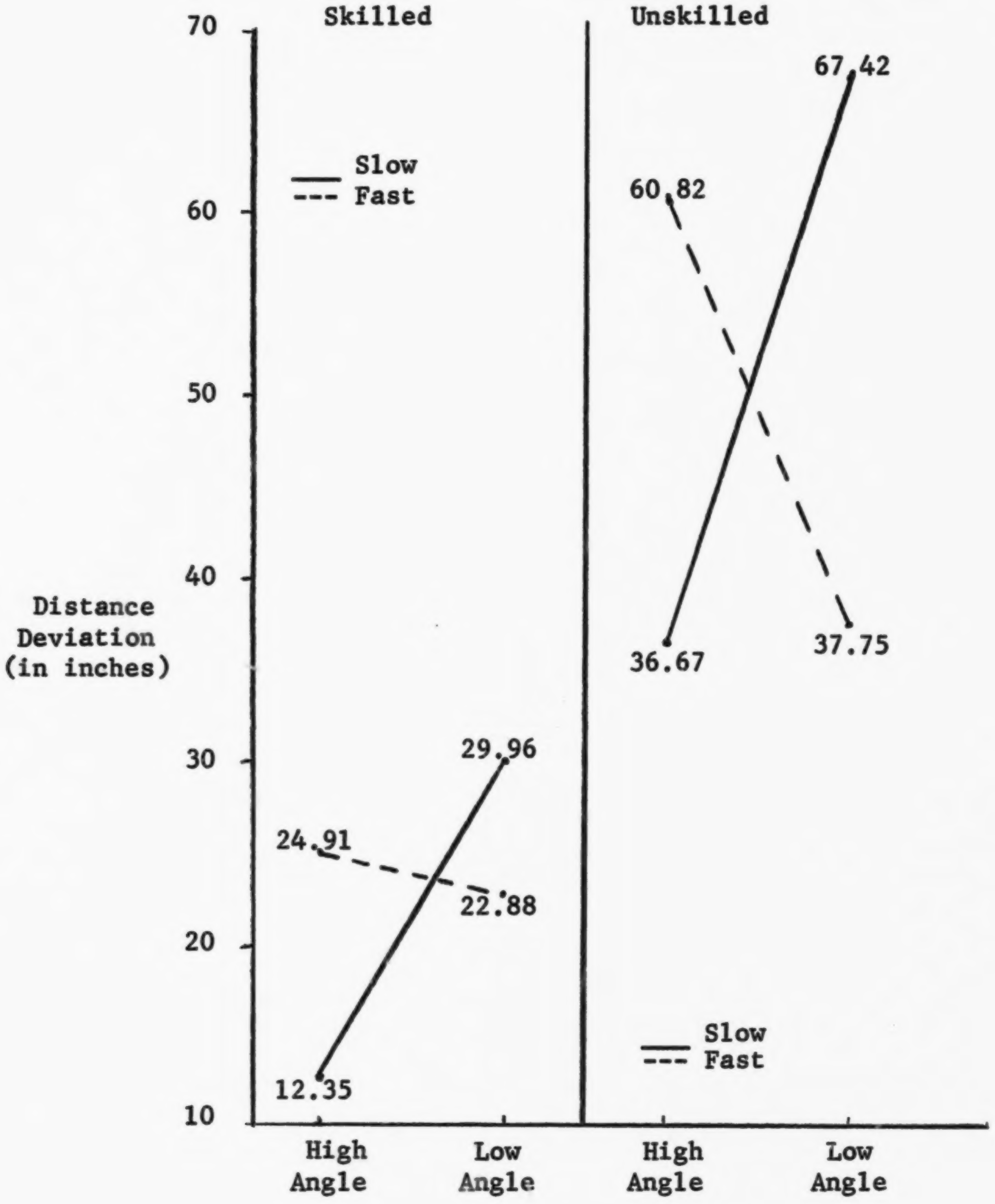
| FST-44° | FST-34° | SLO-44° | SLO-34° |
|---|---|---|---|
| 42.87" | 30.31" | 24.51" | 48.69" |

SKILL X SPEED X VERTICAL DIRECTION

| | | | |
|---|---|---|---|
| HI-SLO-44°<br>12.35" | HI-SLO-34°<br>29.96" | HI-FST-44°<br>24.91" | HI-FAST-34°<br>22.88" |
| LO-SLO-44°<br>36.67" | LO-SLO-34°<br>67.42" | LO-FST-44°<br>60.82" | LO-FAST-34°<br>37.75" |

*Since all possible mean comparisons were not made, lines connect only those means which were compared. Solid lines indicate significance; broken lines indicate no significance.

FIGURE 18. INTERACTION EFFECT: SKILL X SPEED X VERTICAL DIRECTION (DISTANCE DEVIATION IN INCHES)



Radial Error. The results of the analysis of radial error are shown in Table 17, p. 85.

Group Characteristics. Figure 19, p. 87 shows the effect of skill level upon the accuracy of the perceptual judgment in terms of radial or absolute error. Skilled individuals were significantly more accurate than unskilled individuals in judging the flight of the moving object in space. The main effect of age, however, was not significant. Thus for the particular age groups involved in this study, the level of physical maturity of the individual was not an important factor affecting the accuracy of the visuo-perceptual judgment.

Stimulus Attributes of the Moving Object. Stimulus characteristics of the moving object included speed, horizontal direction, and vertical direction of object flight. The main effects of horizontal and vertical direction were significant. (See Table 17, p. 85) In general, objects projected directly at the individual (a horizontal angle of 0°; 36.75") were judged significantly more accurately than those projected to his left (42.39") or right (40.43"; horizontal angle - 5°). (See Table 18, p. 89) For the vertical direction of object flight, objects projected at a greater vertical angle (44° above the horizontal) were judged more accurately than those projected at a flatter vertical angle (34° above the horizontal). The interaction between Horizontal Direction X Vertical Direction was also significant. This suggested that the accuracy of the visuo-perceptual response was dependent upon the particular combination of horizontal and vertical direction of object flight being judged. The nature of this interaction effect is shown in Figure 20, p. 88. As can be seen, objects projected at a flatter vertical angle (34°) were judged equally accurately regardless of the horizontal direction of their flight. Judgments about objects projected at a greater vertical angle (44°), however, were affected differentially by the horizontal direction in which the object was traveling. When the object was projected

TABLE 17. SUMMARY TABLE: ANALYSIS OF VARIANCE - RADIAL ERROR

| Source of Variation | Sum of Squares | df | Mean Square | F-Test | Critical F-Value (.01) |
|---|---|---|---|---|---|
| Group Characteristics (Between Subjects) | | | | | |
| Age | 70,029.30 | 2 | 35,014.65 | 2.31 | 5.08 |
| Skill (Sk) | 1,017,268.36 | 1 | 1,017,268.36 | 67.14* | 7.19 |
| Age X Skill | 80,166.22 | 2 | 40,083.11 | 2.65 | 5.08 |
| Subjects Within Groups | 727,296.48 | 48 | 15,152.01 | | |
| Flight Characteristics (Within Subjects) | | | | | |
| Speed (Sp) | 16,594.45 | 1 | 16,594.45 | .47 | 7.19 |
| Age X Speed | 33,763.04 | 2 | 16,881.52 | .48 | 5.08 |
| Sk X Sp | 10,271.26 | 1 | 10,271.26 | .29 | 7.19 |
| Age X Sk X Sp | 20,264.79 | 2 | 10,132.40 | .29 | 5.08 |
| Sp X Subjects Within Groups | 1,696,971.02 | 48 | 35,353.56 | | |
| Horizontal Direction (HD) | 28,322.17 | 2 | 14,161.08 | 8.04* | 4.82 |
| Age X HD | 7,824.79 | 4 | 1,956.27 | 1.11 | 3.51 |
| Sk X HD | 9,572.44 | 2 | 4,786.22 | 2.72 | 4.82 |
| Age X Sk X HD | 929.94 | 4 | 232.48 | .13 | 3.51 |
| HD X Subjects Within Groups | 169,129.12 | 96 | 1,761.76 | | |
| Vertical Direction (VD) | 53,085.44 | 1 | 53,085.44 | 8.44* | 7.19 |
| Age X VD | 5,095.41 | 2 | 2,547.71 | .40 | 5.08 |
| Sk X VD | 2,616.61 | 1 | 2,616.61 | .42 | 7.19 |
| Age X Sk X VD | 6,134.60 | 2 | 3,067.30 | .49 | 5.08 |
| VD X Subjects Within Groups | 302,073.37 | 48 | 6,293.20 | | |
| Sp X HD | 69,104.35 | 2 | 34,552.18 | 12.23* | 4.82 |
| Age X Sp X HD | 13,363.94 | 4 | 3,340.99 | 1.18 | 3.51 |
| Sk X Sp X HD | 1,125.34 | 2 | 562.67 | .199 | 4.82 |
| Age X Sk X Sp X HD | 1,979.54 | 4 | 494.88 | .175 | 3.51 |
| Sp X HD Subjects Within Groups | 271,134.12 | 96 | 2,824.31 | | |
| Sp X VD | 339,549.00 | 1 | 339,549.00 | 84.69* | 7.19 |
| Age X Sp X VD | 25,941.81 | 2 | 12,970.91 | 3.24 | 5.08 |
| Sk X Sp X VD | 78,672.46 | 1 | 78,672.46 | 19.62* | 7.19 |
| Age X Sk X Sp X VD | 19,341.12 | 2 | 9,670.56 | 2.41 | 5.08 |
| Sp X VD Subjects Within Groups | 192,440.20 | 48 | 4,009.17 | | |

TABLE 17. SUMMARY TABLE: ANALYSIS OF VARIANCE - RADIAL ERROR (CONT'D)

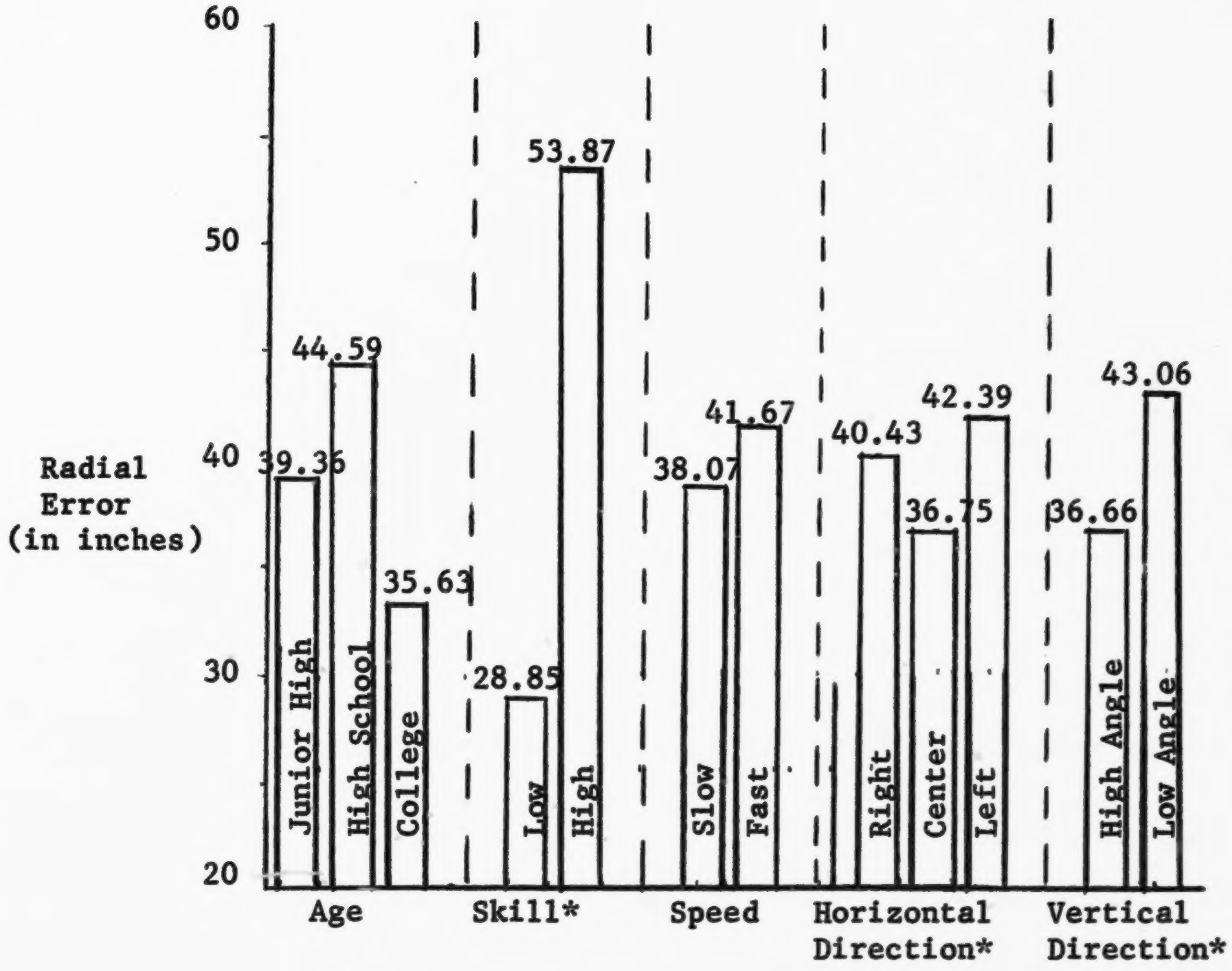
| Source of Variation | Sum of Squares | df | Mean Square | F-Test | Critical F-Value (.01) |
|---|---|---|---|---|---|
| HD X VD | 20,889.36 | 2 | 10,444.68 | 5.04* | 4.82 |
| Age X HD X VD | 2,175.77 | 4 | 543.77 | .26 | 3.51 |
| Sk X HD X VD | 1,250.05 | 2 | 625.02 | .30 | 4.82 |
| Age X Sk X HD X VD | 546.97 | 4 | 136.74 | .07 | 3.51 |
| HD X VD Subjects Within Groups | 199,001.85 | 96 | 2,072.94 | | |
| Sp X HD X VD | 678.63 | 2 | 343.81 | .18 | 4.82 |
| Age X Sp X HD X VD | 1,249.58 | 4 | 312.39 | .17 | 3.51 |
| Sk X Sp X HD X VD | 2,981.34 | 2 | 1,490.67 | .79 | 4.82 |
| Age X Sk X Sp X HD X VD | 5,801.96 | 4 | 1,450.49 | .77 | 3.51 |
| Sp X HD X VD Subjects Within Groups | 180,429.62 | 96 | 1,879.48 | | |

*Significant at the .01 level.

directly toward the individual, it was judged more accurately than when it was projected to either the right or the left of the individual.

The main effect of speed was not significant suggesting that in general the speed of object flight (within the limits of the speeds used) did not significantly affect the accuracy of the visuo-perceptual judgment made by the individual. Significant interactions between Speed X Horizontal Direction and Speed X Vertical Direction indicated that speed did become important when the speed characteristics of object flight were combined with a particular directional component of object flight. (See Table 18, p. 89) These interactions are shown in Figures 21 and 22, p. 90. Figure 21 suggests that when the object was projected to the right of or directly at the individual, speed had little or no effect upon the visuo-perceptual response. However, when the object was moving to the left of the individual, speed became important and objects traveling at a slower speed were judged significantly more accurately than those moving at a faster rate of speed.

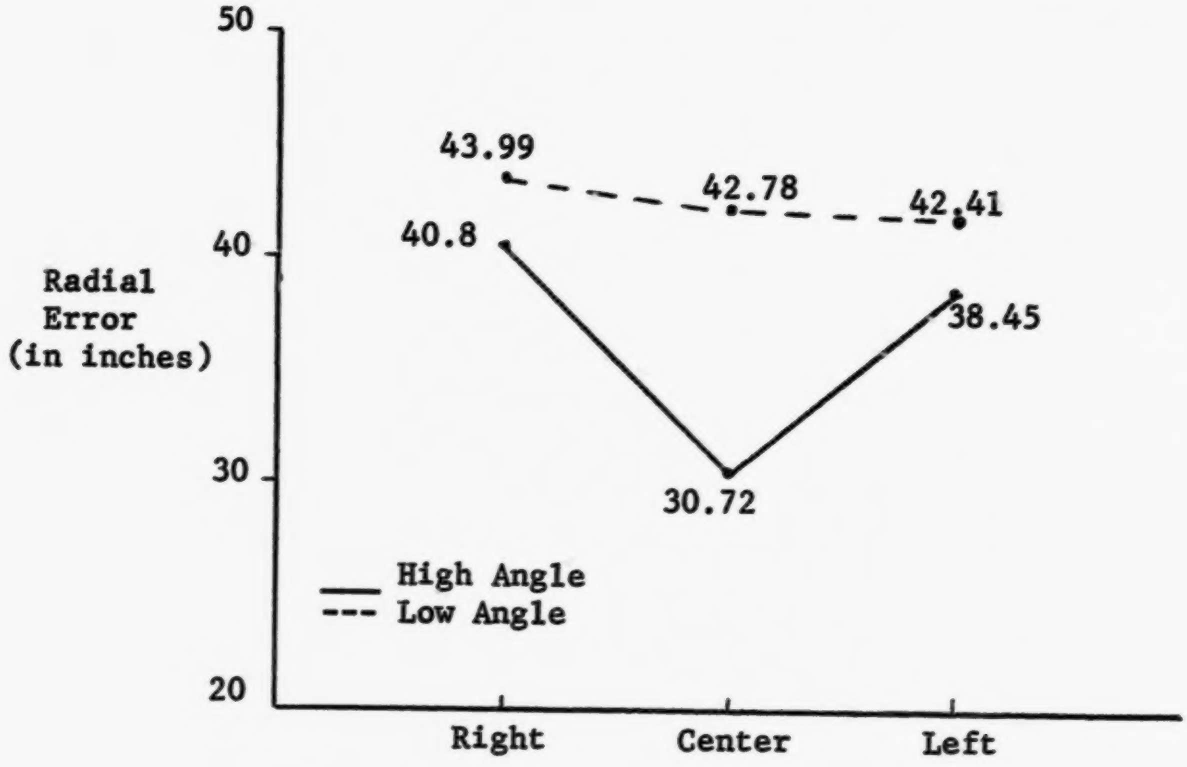
FIGURE 19. ACCURACY OF VISUO-PERCEPTUAL JUDGMENTS AS A FUNCTION OF GROUP CHARACTERISTICS AND STIMULUS ATTRIBUTES OF THE MOVING OBJECT IN SPACE (RADIAL ERROR)



* Significant at .01

In terms of vertical direction, objects projected at a low vertical angle were more difficult to judge when they were traveling at a slow rate of speed. See Figure 22. Conversely, objects projected at a higher vertical angle were more difficult to judge when they were traveling at a fast rate of speed. In addition, the interaction between Skill X Speed X Vertical Direction (See Table 18, p. 89 and Figure 23, p. 91) indicated that visuo-

FIGURE 20. INTERACTION EFFECT: VERTICAL X HORIZONTAL DIRECTION (RADIAL ERROR IN INCHES)



perceptual judgments about objects moving at a given speed and in a given vertical direction were also affected to some degree by the particular skill level of the individual making the judgment. Although difficult to interpret, this interaction effect appeared to involve differences in the accuracy of the visuo-perceptual response when the object was projected at a fast speed. The skilled person judged fast-moving objects equally accurately whether they were projected at a high or low vertical angle. For the unskilled person, objects projected at a fast speed and high vertical angle were significantly more difficult to judge than were objects projected at a fast speed and low vertical angle.

### TABLE 18. SPATIAL ACCURACY OF THE VISUO-PERCEPTUAL JUDGMENT: COMPARISON OF MEANS (RADIAL ERROR)*

HORIZONTAL DIRECTION

| RIGHT | CENTER | LEFT |
|---|---|---|
| 40.43" | 36.75" | 42.39" |

HORIZONTAL X VERTICAL DIRECTION

| RT-44° | CTR-44° | LFT-44° | RT-34° | CTR-34° | LFT-34° |
|---|---|---|---|---|---|
| 40.80" | 30.72" | 38.45" | 43.99" | 42.78" | 42.41" |

SPEED X HORIZONTAL DIRECTION

| FST-RT | FST-CTR | FST-LFT | SLO-RT | SLO-CTR | SLO-LFT |
|---|---|---|---|---|---|
| 38.65" | 37.09" | 49.20" | 42.20" | 36.42" | 35.59" |

SPEED X VERTICAL DIRECTION

| FST-44° | FST-34° | SLO-44° | SLO-34° |
|---|---|---|---|
| 46.54" | 36.75" | 26.78" | 49.36" |

SKILL X SPEED X VERTICAL DIRECTION

| HI-SLO-44° | HI-SLO-34° | HI-FST-44° | HI-FST-34° |
|---|---|---|---|
| 14.55" | 30.76" | 29.33" | 28.76" |
| LO-SLO-44° | LO-SLO-34° | LO-FST-44° | LO-FST-34° |
| 39.01" | 67.96" | 63.75" | 44.75" |

*Since all possible mean comparisons were not made, lines connect only those means which were compared. Solid lines indicate significance; broken lines indicate no significance.

FIGURE 21 . INTERACTION EFFECT: SPEED X HORIZONTAL DIRECTION (RADIAL ERROR IN INCHES)

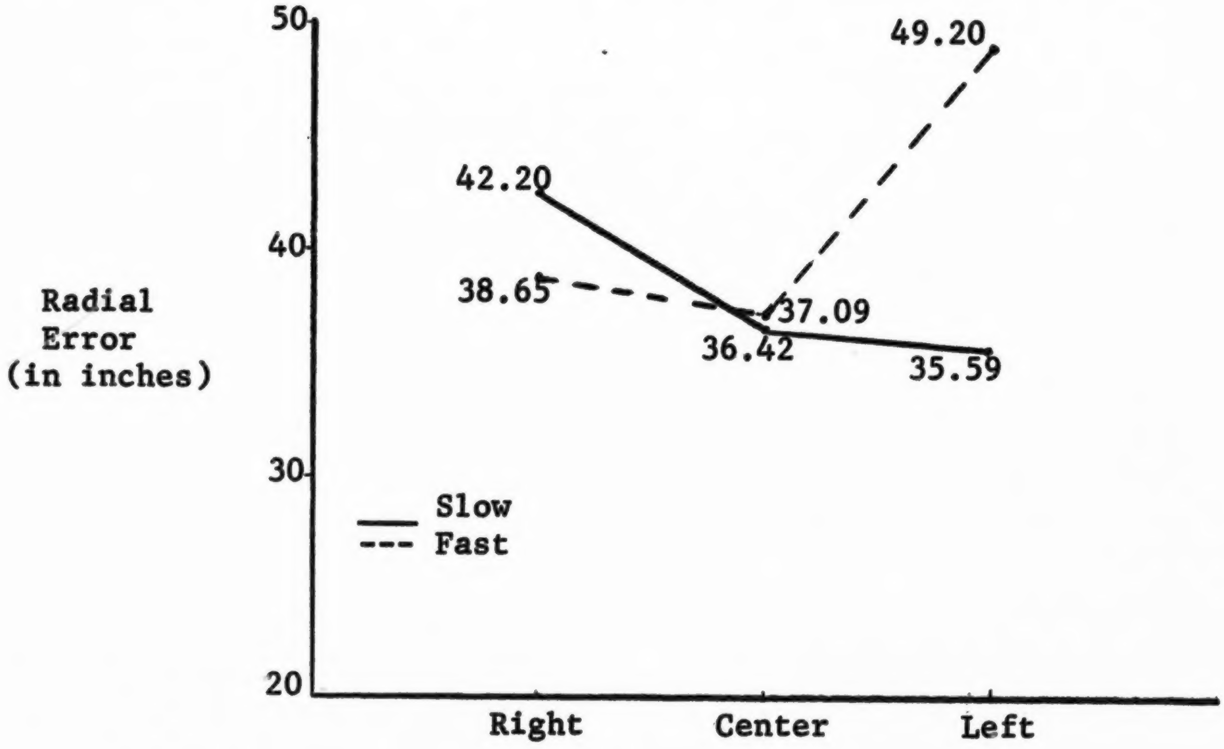


FIGURE 22 . INTERACTION EFFECT: SPEED X VERTICAL DIRECTION (RADIAL ERROR IN INCHES)

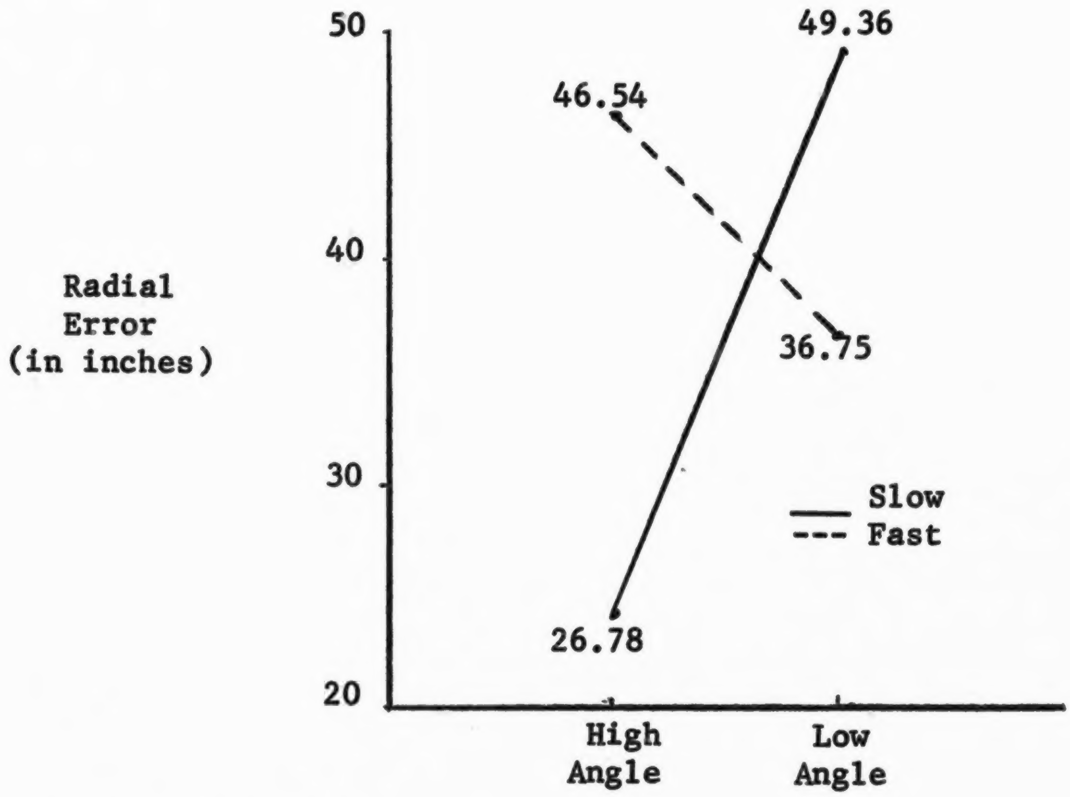
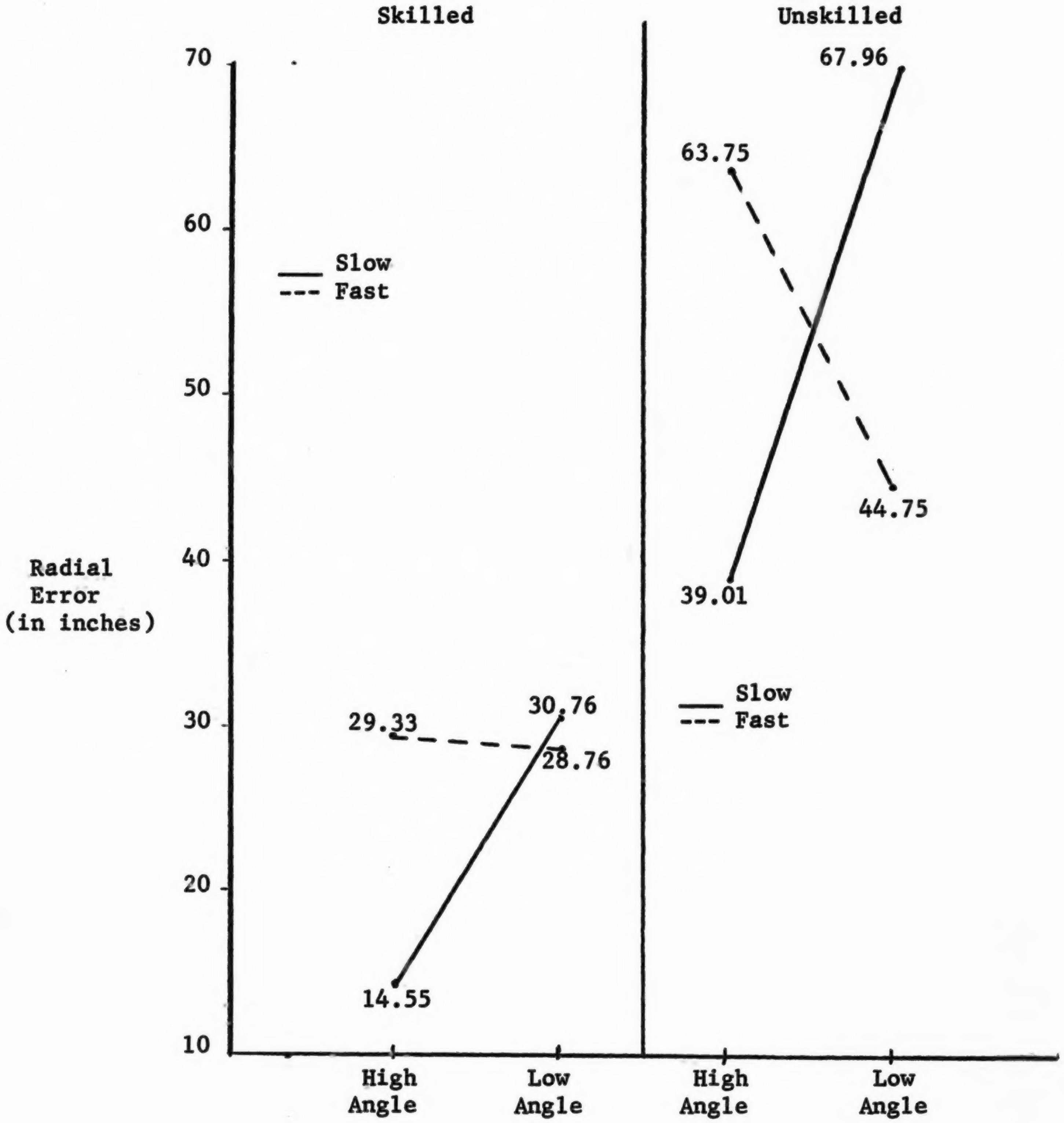


FIGURE 23. INTERACTION EFFECT: SPEED X SKILL X VERTICAL DIRECTION (RADIAL ERROR IN INCHES)



Lateral Deviation. The results of the analysis of lateral deviations or right-left errors made by the individual in judging the flight of the moving object are shown in Table 19, p. 93. (Interpretation of the results of the analysis are made in light of the low reliabilities obtained for this performance measure.)

Group Characteristics. Table 19 indicates that the level of skill of the individual significantly affected the accuracy of his visuo-perceptual response. In terms of right-left error, then, skilled individuals (6.35") judged the flight of the moving object significantly more accurately than did unskilled individuals (8.04"). (See Figure 24, p. 94.)

The age or maturity level of the individual did not significantly affect the precision of the visuo-perceptual judgment. The presence of two significant higher order interactions involving Age X Horizontal Direction (Figure 25, p. 95) and Age X Speed X Horizontal Direction (Figure 26, p. 96) indicated that age may have become an important factor affecting the visuo-perceptual judgment when certain specific combinations of stimulus characteristics were being judged by the individual. However, the exact nature and meaning of these interactions was difficult to establish. Therefore, no strict interpretation of these particular effects was possible.

Stimulus Characteristics of the Moving Object. Each of the three main effects of speed, horizontal direction and vertical direction of object flight were significant. (See Table 19, p. 93) The nature of these effects are shown in Figure 24, p. 94. Overall, errors in the perceptual judgment (right-left error) were greater for objects projected at the fast speed (10.49") than for those projected at the slow speed (3.90"). In terms of horizontal direction of object flight, errors in the perceptual response were greatest for objects

TABLE 19. SUMMARY TABLE: ANALYSIS OF VARIANCE - LATERAL DEVIATION

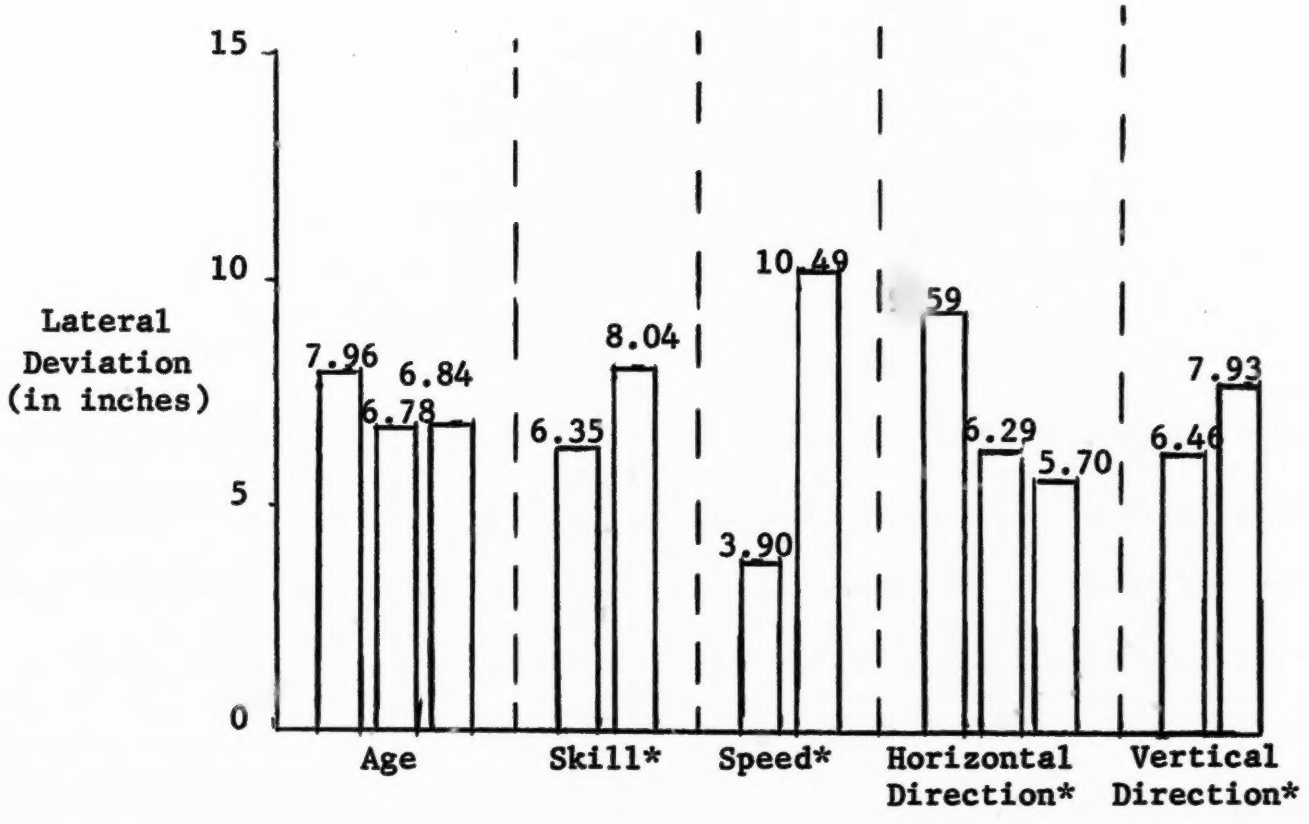
| Source of Variation | Sum of Squares | df | Mean Square | F-Test | Critical F-Value (.01) |
|---|---|---|---|---|---|
| Group Characteristics (Between Subjects) | | | | | |
| Age | 1,511.30 | 2 | 755.65 | 1.66 | 5.08 |
| Skill (Sk) | 3,673.71 | 1 | 3,673.71 | 8.08* | 7.19 |
| Age X Sk | 70.96 | 2 | 35.48 | .08 | 5.08 |
| Subjects Within Groups | 21,823.98 | 48 | 454.67 | | |
| Flight Characteristics (Within Subjects) | | | | | |
| Speed (Sp) | 56,116.35 | 1 | 56,116.35 | 158.64* | 7.19 |
| Age X Sp | 556.30 | 2 | 278.15 | .79 | 5.08 |
| Sk X Sp | 338.15 | 1 | 338.15 | .96 | 7.19 |
| Age X Sk X Sp | 564.40 | 2 | 283.70 | .80 | 5.08 |
| Sp X Subjects Within Groups | 16,978.99 | 48 | 353.73 | | |
| Horizontal Direction | 15,176.13 | 2 | 7,588.06 | 17.69* | 4.82 |
| Age X HD | 23,385.75 | 4 | 5,846.44 | 13.63* | 3.51 |
| Sk X HD | 2,052.12 | 2 | 1,026.06 | 2.39 | 4.82 |
| Age X Sk X HD | 3,645.24 | 4 | 911.31 | 2.12 | 3.51 |
| HD X Subjects Within Groups | 41,190.13 | 96 | 429.06 | | |
| Vertical Direction | 2,811.95 | 1 | 2,811.95 | 23.74 | 7.19 |
| Age X VD | 479.64 | 2 | 239.82 | 2.02 | 5.08 |
| Sk X VD | 836.17 | 1 | 836.17 | 7.06 | 7.19 |
| Age X Sk X VD | 329.00 | 2 | 164.50 | 1.39 | 5.08 |
| VD X Subjects Within Groups | 5,686.13 | 48 | 118.46 | | |
| Sp X HD | 39,178.49 | 2 | 19,589.25 | 68.80* | 4.82 |
| Age X Sp X HD | 8,703.99 | 4 | 2,176.00 | 7.64* | 3.51 |
| Sk X Sp X HD | 1,425.18 | 2 | 712.59 | 2.50 | 4.82 |
| Age X Sk X Sp X HD | 2,954.31 | 4 | 738.58 | 2.59 | 3.51 |
| Sp X HD X Subjects Within Groups | 27,331.91 | 96 | 284.71 | | |
| Sp X VD | 2,269.46 | 1 | 2,269.46 | 21.46* | 7.19 |
| Age X Sp X VD | 205.42 | 2 | 102.71 | .97 | 5.08 |
| Sk X Sp X VD | 53.37 | 1 | 53.37 | .50 | 7.19 |
| Age X Sk X Sp X VD | 323.39 | 2 | 161.70 | 1.53 | 5.08 |
| Sp X VD X Subjects Within Groups | 11,771.06 | 96 | 122.62 | | |

TABLE 19. SUMMARY TABLE: ANALYSIS OF VARIANCE - LATERAL DEVIATION (CONT'D)

| Source of Variation | Sum of Squares | df | Mean Square | F-Test | Critical F-Value (.01) |
|---|---|---|---|---|---|
| HD X VD | 10,129.80 | 2 | 5,064.90 | 41.31* | 4.82 |
| Age X HD X VD | 1,514.81 | 4 | 378.70 | 3.09 | 3.51 |
| Sk X HD X VD | 683.90 | 2 | 341.95 | 2.79 | 4.82 |
| Sk X Age X HD X VD | 724.46 | 4 | 181.12 | 1.48 | 3.51 |
| HD X VD X Subjects Within Groups | 11,771.06 | 96 | 122.62 | | |
| Sp X HD X VD | 2,114.97 | 2 | 1,057.49 | 8.29* | 4.82 |
| Age X Sp X HD X VD | 1,462.29 | 4 | 365.57 | 2.87 | 3.51 |
| Sk X Sp X HD X VD | 292.07 | 2 | 146.03 | 1.14 | 4.82 |
| Age X Sk X Sp X HD X VD | 470.78 | 4 | 117.69 | .92 | 3.51 |
| Sp X HD X VD X Subjects Within Groups | 12,243.85 | 96 | 127.54 | | |

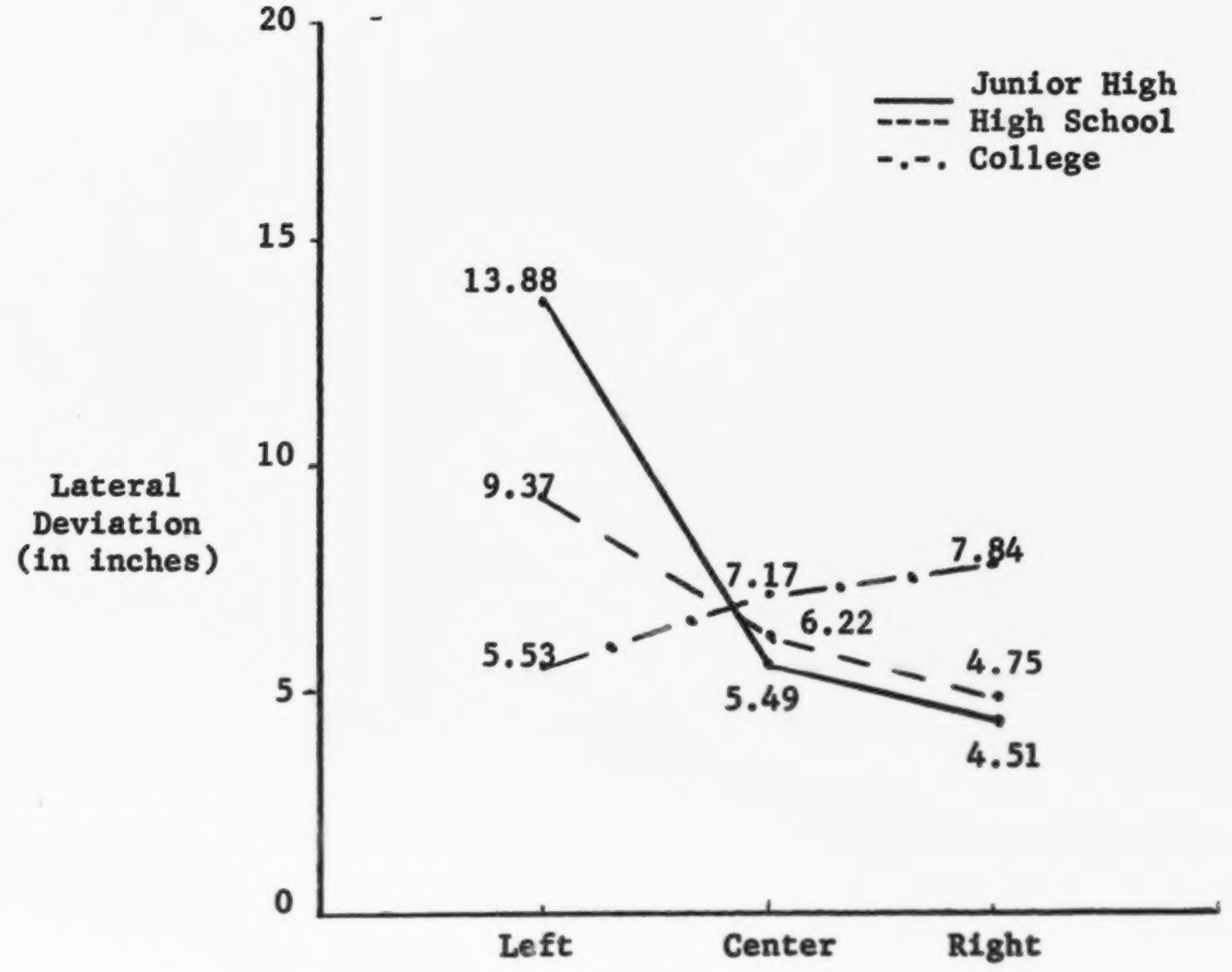
*Significant at the .01 level.

FIGURE 24. ACCURACY OF THE VISUO-PERCEPTUAL JUDGMENT ACCORDING TO GROUP AND STIMULUS CHARACTERISTICS (LATERAL DEVIATION)



*Significant at .01 level

FIGURE 25. INTERACTION EFFECT: AGE X HORIZONTAL DIRECTION (LATERAL DEVIATION IN INCHES)



projected to the left of the individual; for vertical direction, perceptual judgments were less accurate for objects projected at a vertical angle of 34° (7.93") than for objects projected at a vertical angle of 44° (6.46").

The following higher order interactions were also significant: Speed X Horizontal Direction (Figure 27, p.97), Speed X Vertical Direction (Figure 28, p. 97), Horizontal X Vertical Direction (Figure 29, p. 98), and Speed

FIGURE 26. INTERACTION EFFECT: AGE X SPEED X HORIZONTAL DIRECTION (LATERAL DEVIATION IN INCHES)

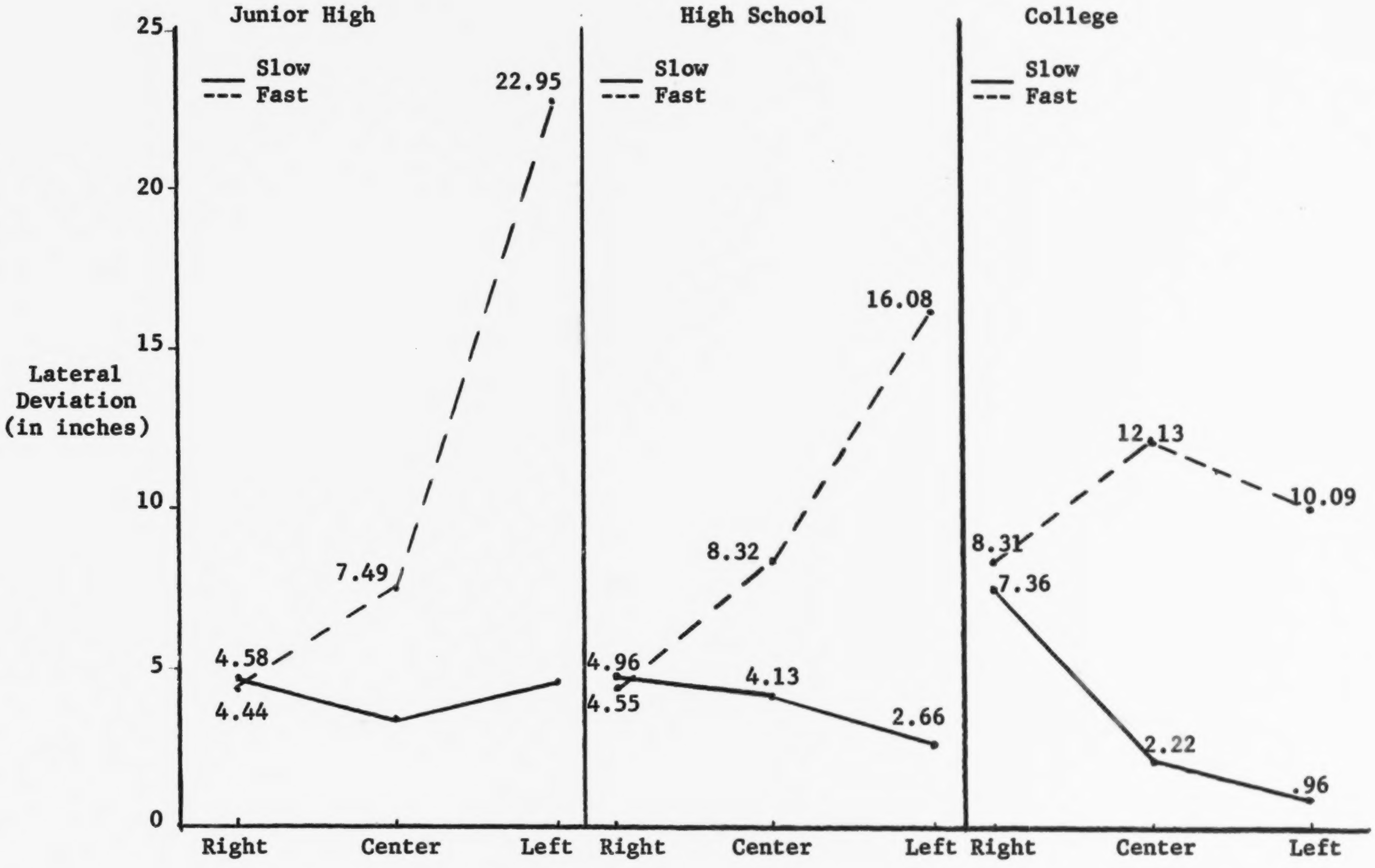


FIGURE 27. INTERACTION EFFECT: SPEED X HORIZONTAL DIRECTION (LATERAL DEVIATION IN INCHES)

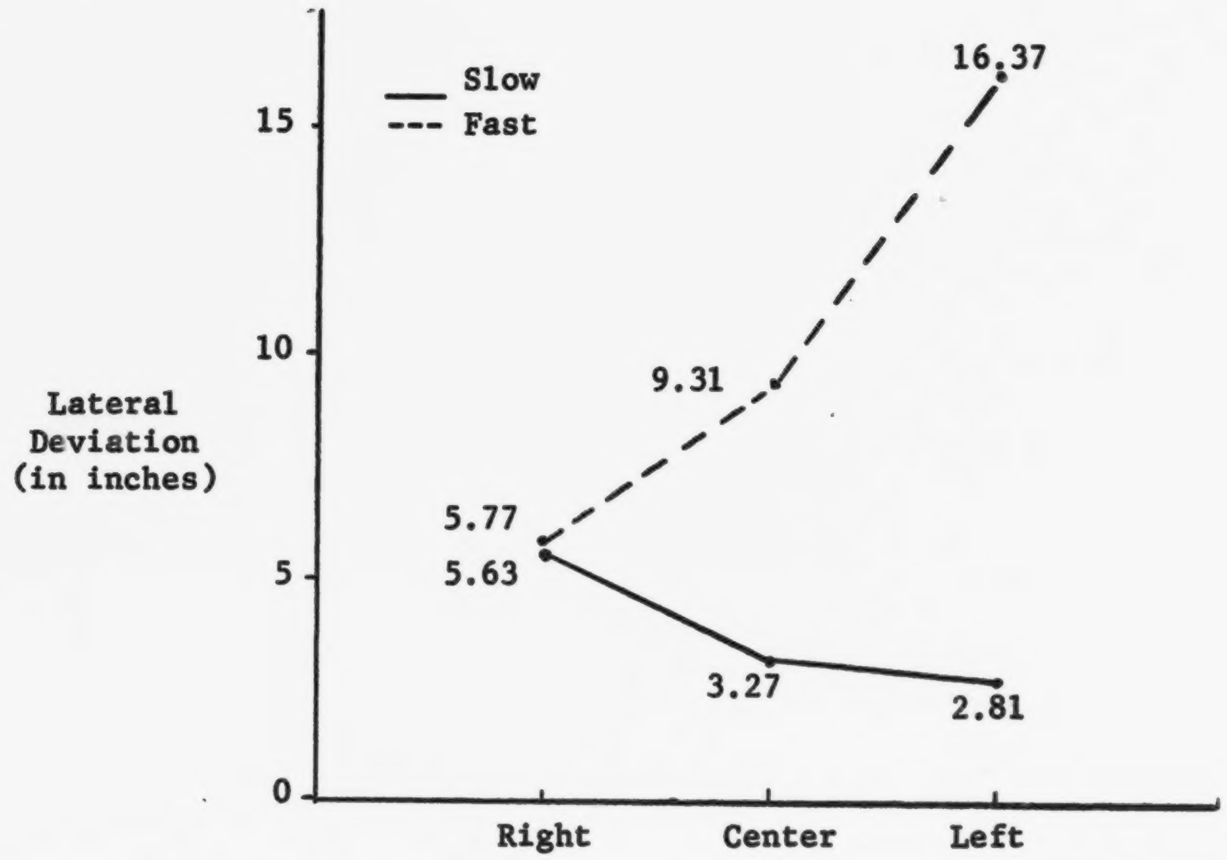


FIGURE 28. INTERACTION EFFECT: SPEED X VERTICAL DIRECTION (LATERAL DEVIATION IN INCHES)

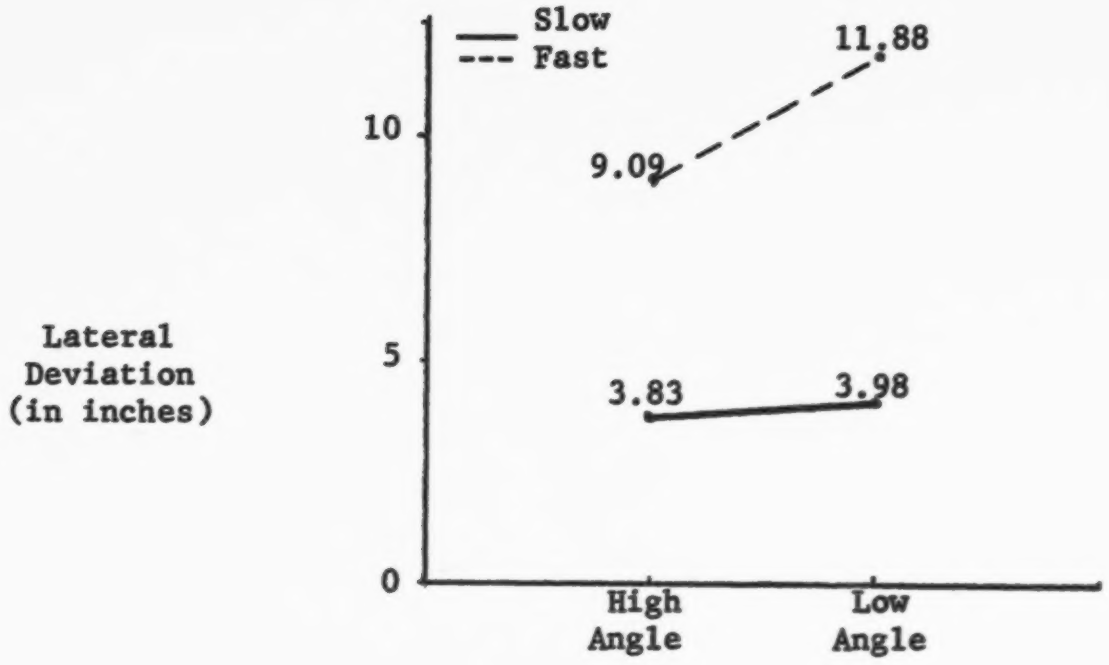
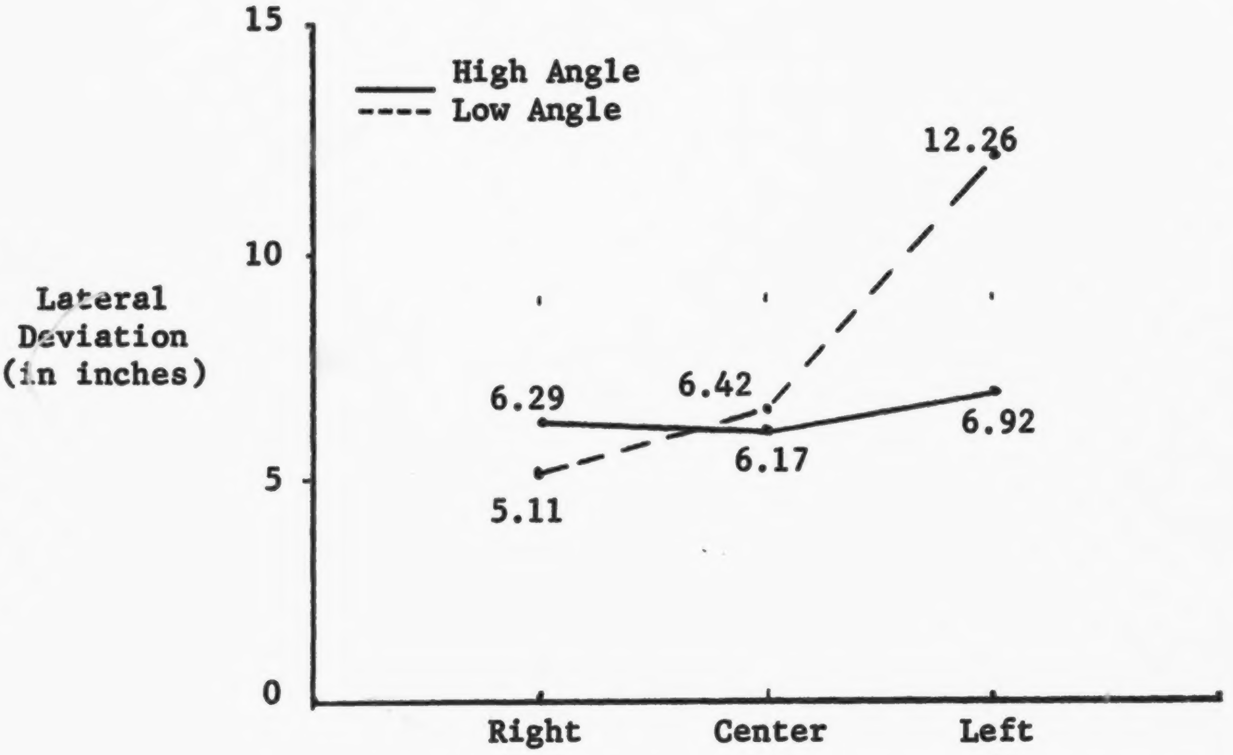


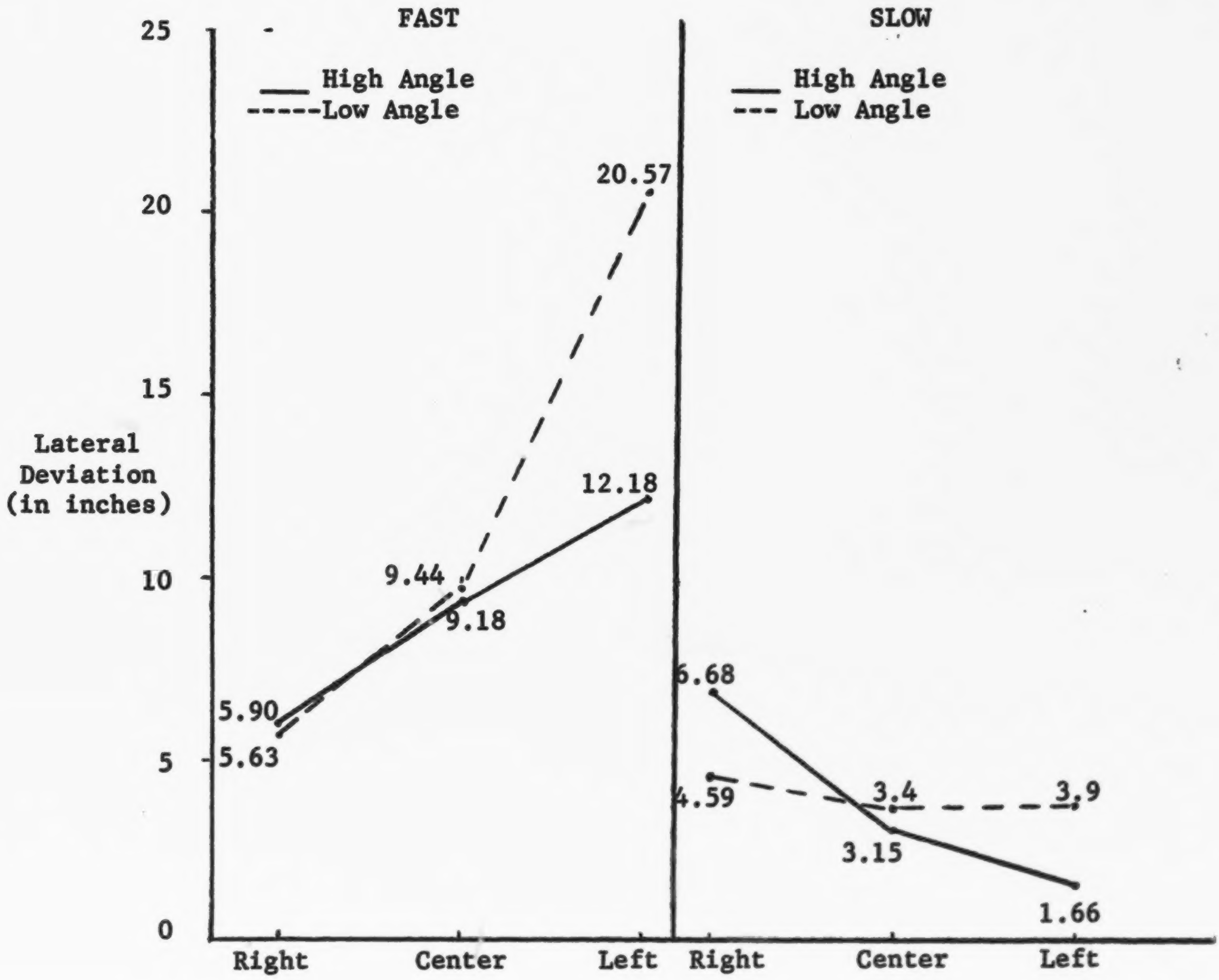
FIGURE 29. INTERACTION EFFECT: HORIZONTAL X VERTICAL DIRECTION (LATERAL DEVIATION IN INCHES)



X Horizontal X Vertical Direction (Figure 30, p. 99). The presence of these significant interactions indicated that, at least in terms of lateral or right-left error, the accuracy of the perceptual judgment made by the individual was dependent to a great extent upon the particular combination of stimulus characteristics he was judging.

The exact reason for these higher order interactions was difficult to establish. Figure 30, p.99, indicates that when the object was moving at a fast rate of speed, horizontal direction always affected the accuracy of the

FIGURE 30. INTERACTION EFFECT: SPEED X HORIZONTAL X VERTICAL DIRECTION (LATERAL DEVIATION IN INCHES)



visuo-perceptual judgment. In addition, when the object was projected to the left of the individual, the vertical direction of object flight also significantly affected the precision of the visuo-perceptual response. In this case, judgments about objects projected at a vertical angle of $34^{o}$ were significantly more accurate than those of objects projected at a greater vertical angle ($44^{o}$). When the object was projected to the right of or directly at the individual, the vertical direction of object flight had little or no effect upon the accuracy of the visuo-perceptual response. (See Table 20, p. 101.)

When the object was projected at a slow speed, the effect of vertical and horizontal direction of object flight was entirely different. For example, when the object was moving horizontally to the right, visuo-perceptual responses were significantly more accurate for objects projected at a low vertical angle ($34^{o}$) than for objects projected at a high vertical angle. Conversely, when the object was traveling horizontally to the left, objects projected at a vertical angle of $44^{o}$ were judged significantly more accurately than those projected at a lower vertical angle ($34^{o}$). For objects moving directly at the individual, vertical direction of object flight had no affect upon the accuracy of the visuo-perceptual response.

## MOVEMENT TIME

Results of the analysis of movement time are shown in Table 21, p. 102.

Group Characteristics. No significant effect due to skill level was found. See Table 21. Thus skilled individuals tended to remain in motion equally as long as unskilled individuals. Although movement time decreased slightly with increasing age or maturity level, the difference between the various age groups was not statistically significant. In general then, regardless of skill or age classification, movement time tended to be the same across all individuals.

TABLE 20. SPATIAL ACCURACY OF THE VISUO-PERCEPTUAL JUDGMENT: COMPARISON OF MEANS (LATERAL DEVIATION)*

HORIZONTAL DIRECTION

| RIGHT | CENTER | LEFT |
|---|---|---|
| 5.70" | 6.29" | 9.59" |

AGE X HORIZONTAL DIRECTION

| RIGHT | | | CENTER | | | LEFT | | |
|---|---|---|---|---|---|---|---|---|
| JR | HI | COLL | JR | HI | COLL | JR | HI | COLL |
| 4.51" | 4.75" | 7.84" | 5.49" | 6.22" | 7.17" | 13.88" | 9.37" | 5.53" |

HORIZONTAL X VERTICAL DIRECTION

| RT-44° | CTR-44° | LFT-44° | RT-34° | CTR-34° | LFT-34° |
|---|---|---|---|---|---|
| 6.29" | 6.17" | 6.92" | 5.11" | 6.42" | 12.26" |

SPEED X HORIZONTAL DIRECTION

| FST-RT | FST-CTR | FST-LFT | SLO-RT | SLO-CTR | SLO-LFT |
|---|---|---|---|---|---|
| 5.77" | 9.31" | 16.37" | 5.63" | 3.27" | 2.81" |

SPEED X VERTICAL DIRECTION

| FST-44° | FST-34° | SLO-44° | SLO-34° |
|---|---|---|---|
| 9.09" | 11.88" | 3.83" | 3.98" |

*Since all possible mean comparisons were not made, lines connect only those means which were compared. Solid lines indicate significance; broken lines indicate no significance.

TABLE 21. SUMMARY TABLE: ANALYSIS OF VARIANCE - MOVEMENT TIME

| Source of Variation | Sum of Squares | df | Mean Square | F-Test | Critical F-Value (.01) |
|---|---|---|---|---|---|
| Group Characteristics (Between Subjects) | | | | | |
| Age | 8.8143 | 2 | 4.4071 | 1.28 | 5.08 |
| Skill (Sk) | .2175 | 1 | .2175 | .06 | 7.19 |
| Age X Sk | 10.4239 | 2 | 5.2120 | 1.51 | 5.08 |
| Subjects Within Groups | 165.4332 | 48 | 3.4465 | | |
| Flight Characteristics (Within Subjects) | | | | | |
| Speed (Sp) | 48.0095 | 1 | 48.0095 | 67.12* | 7.19 |
| Age X Sp | .7084 | 2 | .3542 | .495 | 5.08 |
| Sk X Sp | .0002 | 1 | .0002 | - | 7.19 |
| Age X Sk X Sp | 2.7157 | 2 | 1.3578 | 1.898 | 5.08 |
| Speed X Subjects Within Groups | 34.3322 | 48 | .7153 | | |
| Horizontal Direction (HD) | 19.1778 | 2 | 9.5889 | 30.42* | 4.82 |
| Age X HD | .9152 | 4 | .2288 | .73 | 3.51 |
| Sk X HD | 2.4818 | 2 | 1.2409 | 3.94 | 4.82 |
| Age X Sk X HD | .5902 | 4 | .1475 | .47 | 3.51 |
| HD X Subjects Within Groups | 30.2605 | 96 | .3152 | | |
| Vertical Direction (VD) | 5.7533 | 1 | 5.7533 | 28.13* | 7.19 |
| Age X VD | .5554 | 2 | .2777 | 1.36 | 5.08 |
| Sk X VD | .1658 | 1 | .1658 | .81 | 7.19 |
| Age X Sk X VD | .1058 | 2 | .0529 | .26 | 5.08 |
| VD X Subjects Within Groups | 9.8180 | 48 | .2045 | | |
| Sp X HD | 1.5588 | 2 | .7794 | 4.07 | 4.82 |
| Age X Sp X HD | .7371 | 4 | .1843 | .96 | 3.51 |
| Sk X Sp X HD | .3615 | 2 | .1807 | .94 | 4.82 |
| Age X Sk X Sp X HD | .8459 | 4 | .2115 | 1.10 | 3.51 |
| Sp X HD X Subjects Within Groups | 18.3856 | 96 | .1915 | | |
| Sp X VD | 1.7270 | 1 | 1.7270 | 12.18* | 7.19 |
| Age X Sp X VD | .1055 | 2 | .0528 | .37 | 5.08 |
| Sk X Sp X VD | .2142 | 1 | .2142 | 1.51 | 7.19 |
| Age X Sk X Sp X VD | 1.2139 | 2 | .6069 | 4.28 | 5.08 |
| Sp X VD X Subjects Within Groups | 6.8079 | 48 | .1418 | | |

TABLE 21. SUMMARY TABLE: ANALYSIS OF VARIANCE - MOVEMENT TIME (CONT'D)

| Source of Variation | Sum of Squares | df | Mean Square | F-Test | Critical F-Value (.01) |
|---|---|---|---|---|---|
| HD X VD | .0578 | 2 | .0289 | .21 | 4.82 |
| Age X HD X VD | .6705 | 4 | .1676 | 1.23 | 3.51 |
| Sk X HD X VD | 1.1916 | 2 | .5958 | 4.36 | 4.82 |
| Age X Sk X HD X VD | .1999 | 4 | .0499 | .37 | 3.51 |
| HD X VD X Subjects Within Groups | 13.1148 | 96 | .1366 | | |
| Sp X HD X VD | .2748 | 2 | .1374 | 1.15 | 4.82 |
| Age X Sp X HD X VD | .5801 | 4 | .1450 | 1.22 | 3.51 |
| Sk X Sp X HD X VD | .1303 | 2 | .0652 | .55 | 4.82 |
| Age X Sk X Sp X HD X VD | .1969 | 4 | .0492 | .41 | 3.51 |
| Sp X HD X VD X Subjects Within Groups | 11.4468 | 96 | .1192 | | |

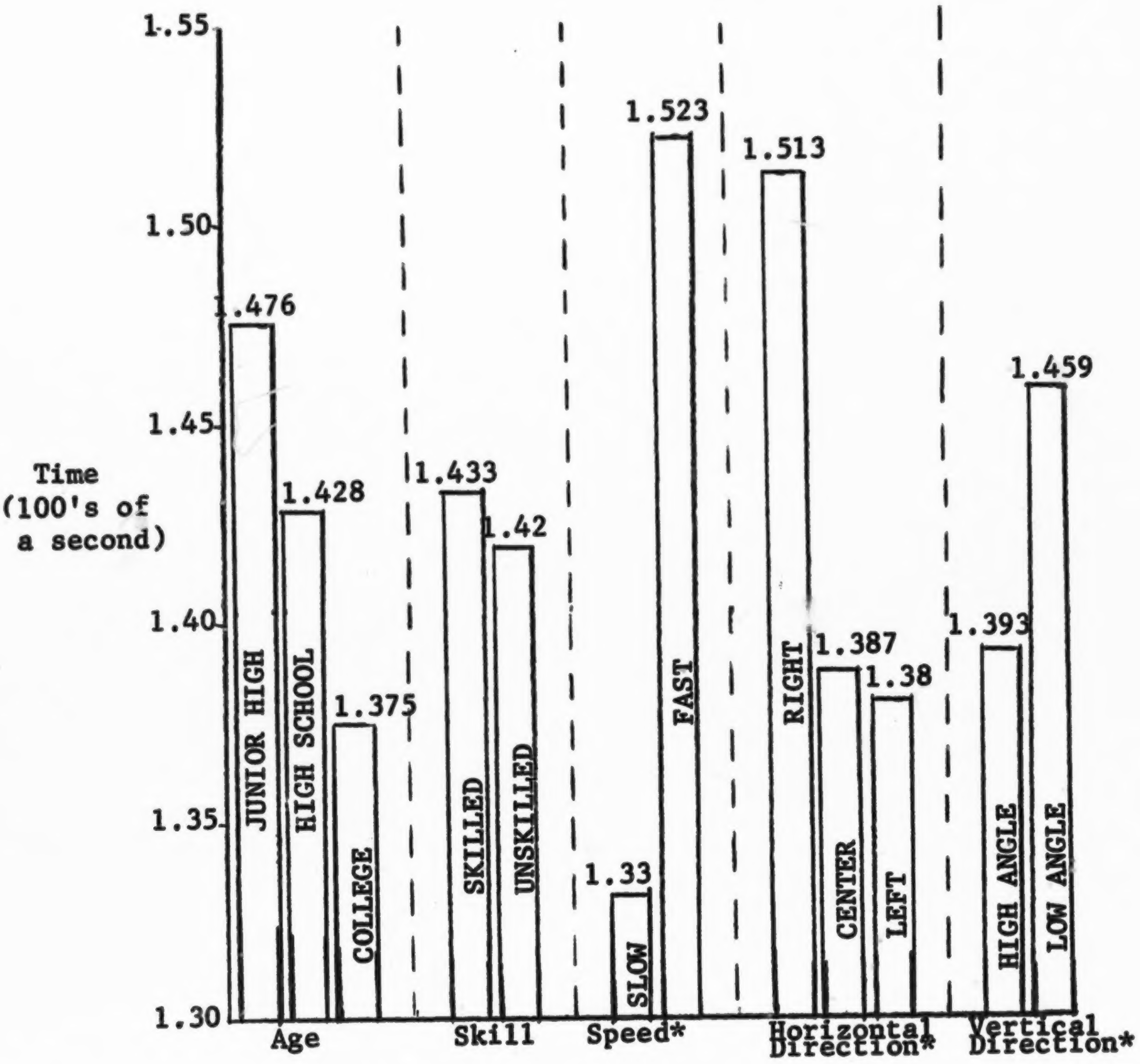
*Significant at the .01 level.

It should perhaps be pointed out that movement time, in this case, did not represent speed of movement as the distance traveled or covered by the individual during the time measured as movement time was free to vary. Thus the usefulness or meaningfulness of these particular data are open to question.

Stimulus Characteristics of the Moving Object. The three main effects of speed, horizontal and vertical direction of object flight were significant. The average movement time for each of these main effects is shown in Figure 31, p. 104. As can be seen, when the object was moving at a fast rate of speed, subjects tended to have significantly longer movement times than when the object was projected at a slow speed.

The vertical direction of object flight was also a significant factor affecting the total length of time the individual remained in motion. Subjects tended to have longer movement times when the object was projected at a flatter vertical angle (34°) than when it was projected at a greater vertical angle (44°).

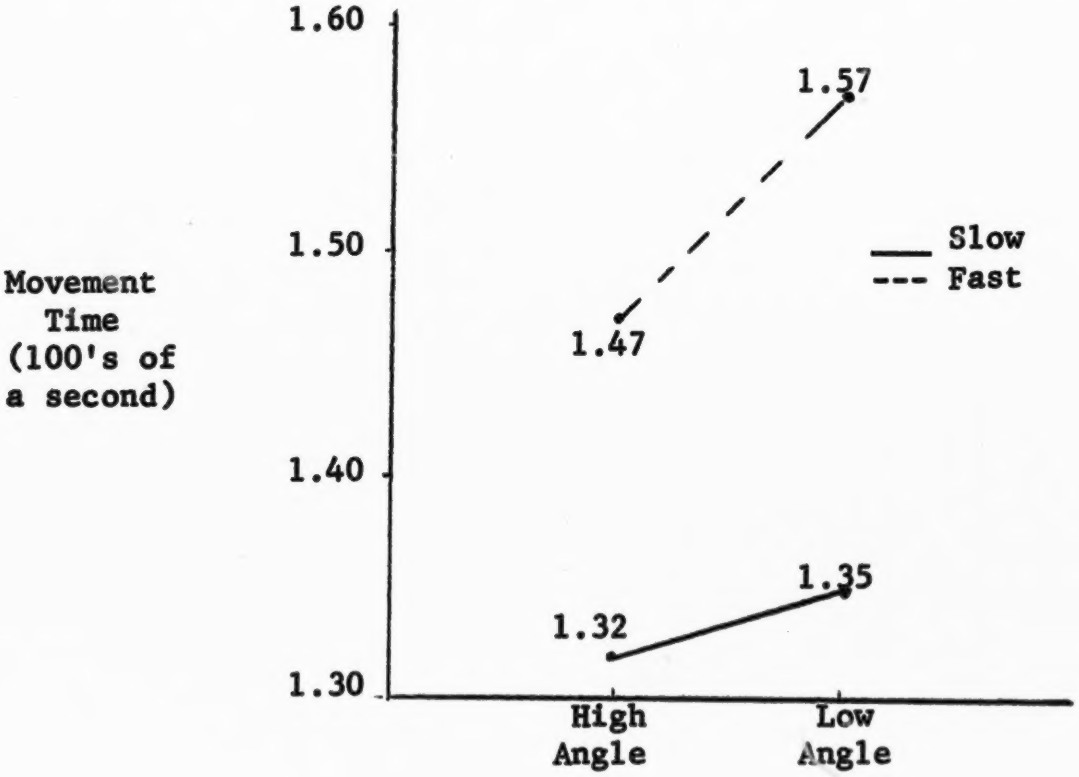
FIGURE 31. MOVEMENT TIME AS A FUNCTION OF GROUP AND STIMULUS CHARACTERISTICS



* Significant at .01

The significant interaction between Speed X Vertical Direction, shown in Figure 32, p. 105, indicated that the length of time the subject remained in motion was affected by the particular combination of speed and vertical direction of object flight. At a slow speed, the individual tended to remain in motion for equally long periods of time regardless of the vertical direction of object flight. When the object was projected at a fast speed, however, the vertical direction of flight appeared to significantly affect the amount of time the individual remained in motion. Movement time was longer for objects projected at a vertical angle of 34° than for objects projected at a vertical angle of 44°. (See Table 22, p. 106).

FIGURE 32. INTERACTION EFFECT: SPEED X VERTICAL DIRECTION (MOVEMENT TIME IN 100'S OF A SECOND)



The horizontal direction of object flight also appeared to significantly affect the total movement time of the individual. When the object was projected to the right, the subject remained in motion significantly longer than when it was projected to his left or directly at him. (See Table 22.)

TABLE 22. MOVEMENT TIME: COMPARISON OF MEANS (1/100'S OF SEC)*

| HORIZONTAL DIRECTION | | |
|---|---|---|
| RIGHT | CENTER | LEFT |
| 1.513 | 1.387 | 1.380 |

| SPEED X VERTICAL DIRECTION | | | |
|---|---|---|---|
| FAST-44° | FAST-34° | SLO-44° | SLO-34° |
| 1.47 | 1.57 | 1.32 | 1.35 |

*Since all possible mean comparisons were not made, lines connect only those means which were compared. Solid lines indicate significance; broken lines indicate no significance.

## SUMMARY

*Speed of the Visuo-Perceptual Response*. (Reaction Time)

*Group Characteristics*. In terms of the speed of the visuo-perceptual response, *skilled* individuals judged the flight of the moving object *significantly more rapidly* than did unskilled individuals. Although the speed of the visuo-perceptual judgment tended to be faster in the older age groups, age or maturity level did not, in general, significantly affect the speed with which the individual visually judged the moving object in space.

*Stimulus Characteristics of the Moving Object*. The speed of the perceptual judgment was significantly affected by the speed and horizontal direction of object flight. In general, individuals responded significantly more rapidly to fast-moving objects than to slow-moving objects. Individuals also responded more quickly to objects moving horizontally to the right than to objects moving horizontally to the left or directly at them. Vertical direction of object flight, however, had no significant effect upon the speed of the visuo-perceptual response.

Spatial Accuracy of the Visuo-Perceptual Judgment.

Group Characteristics. Without exception, the analysis of the measures of spatial accuracy (including radial, depth and lateral deviations) indicated that skilled individuals were significantly more accurate in judging the flight of the moving object than were unskilled individuals. In terms of distance or depth error, the visuo-perceptual response of the skilled individual was, on the average, twice as accurate as that of the unskilled person. With respect to radial or absolute error, the skilled individual again was significantly superior to the unskilled individual in judging the flight of the moving object in space. In terms of lateral error, the difference between the skilled and unskilled groups was small (skilled-6.35"; unskilled-8.04") but statistically significant.

The age or maturity level of the individual did not, in any case (radial, distance, or lateral error), significantly affect the accuracy of the visuo-perceptual judgment. In two instances, however, there were significant interactions between age and certain stimulus characteristics of the moving object. Analysis of the distance deviation measure revealed a significant interaction between age, speed and vertical direction of object flight. Analysis of the lateral deviation measure showed a significant interaction between age, speed and horizontal direction of object flight. Both of these interactions suggested that the effect of horizontal or vertical direction of object flight was much the same for all age groups when the object was moving at a slow rate of speed. The effect of the direction of object flight differed, however, for different age groups when the object was moving at a fast rate of speed. The exact nature of this effect, however, was unclear.

Stimulus Characteristics of the Moving Object.

(1) Radial and Distance Error. Without exception, the analysis of these two performance measures revealed the same significant relationships. In terms of radial and distance error, the main effects of horizontal and vertical direction of object flight were significant. This suggested that the accuracy of the visuo-perceptual response was affected by the particular vertical or horizontal direction in which the object was moving. The significant interaction between horizontal and vertical direction of object flight indicated, however, that the effect of horizontal direction held true only for objects projected at a vertical angle of 44°.

The main effect of speed of object flight was not significant. Speed seemed, however, to become important when it was combined with a given horizontal or vertical direction of object flight. The significant interaction between skill, speed, and vertical direction further suggested that the skilled individual was able to judge fast-moving objects equally accurately regardless of the vertical direction of object flight. The accuracy of the perceptual response of the unskilled individual was, on the contrary, affected in different ways by the vertical direction of the object's flight. For slow-moving objects, the effect of the vertical direction of object flight was much the same for both skill groups. (It should be kept in mind that in all instances the skilled individual was significantly more accurate than the unskilled.)

(2) Lateral Deviation. Analysis of the Lateral Deviation measure revealed the following significant effects: Speed, Horizontal Direction, Vertical Direction, Speed X Horizontal Direction, Speed X Vertical Direction, Horizontal

Direction X Vertical Direction, and Speed X Vertical Direction X Horizontal Direction. In terms of right-left error, then slow-moving objects were judged more accurately than fast-moving objects; objects moving to the right of or directly at the individual were judged more accurately than objects moving to the left of the individual; and objects projected at a greater vertical angle (44°) were judged more accurately than those projected at a flatter vertical angle (34°). The significant interaction between speed, horizontal and vertical direction suggested that when objects were moving at a fast rate of speed, the horizontal direction of object flight always significantly affected the accuracy of the visuo-perceptual judgment. Vertical direction, however, was important only when the object was moving to the left. For objects moving at a slow rate of speed, vertical and horizontal direction of object flight interacted in specific ways to affect the accuracy of the visuo-perceptual judgment.

Movement Time. There were no significant differences between age or skill groups in terms of the length of time the individual remained in motion. Movement times were in general significantly longer when objects were moving at a fast rate of speed than when they were moving at a slow rate of speed. Movement times were also significantly longer when objects were projected to the right of the individual than when they were projected at a horizontal angle of 0° or 5°-left. When objects were projected at a vertical angle of 34°, individuals tended to remain in motion significantly longer than when they were projected at a vertical angle of 44°. The interaction between Speed X Vertical Direction was significant. At the slow speed, the vertical direction of object flight appeared to have little or no effect upon the movement time of the individual. On the other hand, when the object was moving at a fast rate of speed, movement time was significantly longer for objects projected at a vertical angle of 34° than for objects projected at a vertical angle of 44°. The value of this performance measure is questionable.

# CHAPTER VI

# SUMMARY, DISCUSSION, CONCLUSIONS

## SUMMARY

The purpose of the present study was threefold: (i) to assess the effects of systematic variation in velocity and direction of ball flight upon visuo-perceptual judgments made about moving objects in space; (ii) to determine whether or not highly-skilled and poorly-skilled performers differ in their ability to visually judge the flight of a moving object in three-dimensional space, and (iii) to assess the effect of age or maturity level of the individual upon the speed and accuracy of such visuo-perceptual judgments.

The experimental situation was as follows: a tennis ball was projected into the air from a Tennis Ball-Boy machine. The ball was interrupted in its flight by a canvas suspended four to five feet above the head of the subject. Subjects thus never came into actual physical contact with the moving object. The task of the subject was to visually judge the flight of this moving object, that is, to decide where the object was going in its flight, to select an 'optimum point for interception', and then to move as quickly as possible to that selected spot.

Five variables were selected for study. These included:

(a) Speed of Object Projection (two levels), used to assess the effects of velocity of ball flight upon judgments about moving objects in space;

(b) Vertical Angle of Object Projection (two levels), used to assess the effects of the vertical direction of object flight upon visuo-perceptual judgments about moving objects in space;

(c) Horizontal Angle of Object Projection (three levels), which served as a basis for evaluating the effects of horizontal direction of object flight upon visual judgments about the flight of moving objects;

(d) Skill Level (two levels); and

(e) Age or Maturity Level (three levels).

These latter two variables provided the bases for looking at differences in visuo-perceptual performances as a function of skill and/or age classification.

A total of fifty-four (54) subjects participated in the study. Eighteen subjects each were selected from a population of junior high, high school, and college age males. Of the eighteen subjects thus selected, nine were further classified as skilled, nine as unskilled. The criteria for skill classification were: (a) the number of years of participation in organized baseball competition, including varsity and/or Little League membership and (b) the position held by the individual in a distribution of scores based upon performances on an Overarm Throw for Velocity test. Subjects were also screened for minimum visual acuity and depth perception capacity.

Measures of the visuo-perceptual judgment included a reaction time measure, a movement time index, and three measures of the spatial accuracy of the visuo-perceptual judgment. The data were analyzed by means of five separate uni-variate analyses of variance, each using a single performance index per analysis. Where appropriate, Scheffe's Multiple-Comparisons Test was used to compare differences between group means.

## DISCUSSION

Before the turn of the century Sechenov, a Russian physiologist, asserted that all of man's behavior could be thought of as consisting of three main processes: (a) a sensory input, (b) a cortical process, and (c) an efferent or motor outflow. Sechenov further hypothesized that the last of these processes, the efferent or motor output, was dependent in large part upon the nature of the sensory input and the central elaboration or processing of that sensory input. (65)

Modern day information processing theories have adopted a similar kind of schema in an attempt to explain the nature and functioning of the nervous system of man. Such theories suggest that one of the most important steps leading to the production of any motor act is the receiving and processing of sensory information appropriate to that behavior. (114) The processing of such sensory information, it is suggested, involves the changing or encoding of the physical stimulation received by the individual into some neural form. Accordingly, this sensory information is then translated, by means of intricate central nervous system processes, into appropriate motor or efferent output. The end result of this information processing cycle, then, is the behavior which we observe, the overt movement or motor response. The overall success or failure of the motor act, according to such theories, is largely governed by the effectiveness of the information processing mechanism of the individual, that is, by the speed and precision with which incoming sensory information can be processed. According to this formulation, then, the speed and precision with which the flight of a moving object in space could be judged would be dependent, to a large extent, upon how quickly and accurately pertinent visual information, derived from the flight of the moving object itself, could be processed by the individual. It is within this general framework that the following discussion is presented.

Problem I. What are the effects of systematic variation in velocity and direction of ball flight upon the speed and precision with which visuo-perceptual judgments are made about moving objects in space?

Accuracy of the Visuo-Perceptual Judgment. Data from the present study indicated that the accuracy with which the individual was able to judge the flight of a moving object in space was, in most cases, dependent upon the particular speed, horizontal and/or vertical direction in which the object was moving. For example, objects projected at a high vertical angle were judged more accurately when they were traveling at a slow speed while objects projected at a flatter vertical angle were judged more accurately when they were traveling at a fast rate of speed. Along the same line, objects projected at a high vertical angle (44°) were judged more accurately if they were also moving directly toward the individual. Objects projected at a flatter vertical angle (34°), however, were judged equally accurately regardless of the horizontal direction in which they were moving.

From an information processing point of view, it would appear, then, that certain kinds or combinations of visual cues were more difficult for the individual to process accurately than were certain others. That is, the accuracy with which the flight of the moving object in space was judged was a function of the particular combination of visual cues which had to be judged. It is interesting to note that psychologists have also shown in a number of other studies that the precision of judgments about static stimulus situations varies markedly depending upon the nature and arrangement of the elements making up the stimulus complex. (21,27,35,85) Apparently, dynamic three-dimensional stimulus situations are no exception to this rule.

The combined effect of speed and horizontal direction of object flight upon the accuracy of the visuo-perceptual response was particularly interesting. The nature of this interaction was as follows: When the object was moving to the right or directly at the individual, the speed of its flight had no effect upon the precision with which the moving object was judged. On the other hand, when the object was moving horizontally to the left, the speed at which the object was traveling became an important factor affecting the accuracy of the perceptual response. In this instance, individuals judged the flight of a slow-moving object significantly more precisely than that of a fast-moving object.

One of the factors which purportedly affects the accuracy of information processing is the rate at which such information must be handled. In other words, information received at a fast rate of speed appears to be more difficult to process accurately than information received at a slow rate of speed. (114) On this basis, then, one might have expected fast-moving objects to be more difficult for individuals to accurately judge than slow-moving objects. The present data indicated, however, that speed alone did not significantly affect the accuracy with which the flight of the moving object was judged. Why then did the predicted speed affect appear when the object was moving horizontally to the left of the individual? The writer is inclined to speculate that a part of the reason this particular speed-horizontal direction effect was observed is related to the concept of sensory dominance.

Let us assume, for purposes of discussion, that the sensory dominance or 'sidedness' of the individual is related to the accuracy of information processing in such a way that sensory information received from objects or events related to the non-dominant side of the individual is more difficult to process accurately than information received from similar objects or events related to the dominant side. Under this set of rules, then, a 'right-sided' individual would, in general, have more difficulty in judging the flight of an object moving to his left than in judging the flight of an object moving to his right. If we add to this then an increase in the rate at which such information must be processed, due to an increase in the speed of the flight of the moving object, an additional stress is placed on the information processing mechanism of the individual, a stress which could result in a decrease in the accuracy with which fast-moving objects were judged. In other words, it is possible that when the object was moving to the left of the individual but at a slow rate of speed, the visual information concerning the flight of the moving object was received at a rate slow enough to permit accurate processing of the incoming information. However, when the speed of this moving object was increased, the rate at which sensory information was received and processed also increased and, as a result, accurate processing of the incoming sensory information may not have been possible. If this were the case, then, judgments about the flight of fast-moving objects, traveling horizontally to the left, would have been less accurate than those for objects moving in the same direction but at a slow rate of speed.

Although the foregoing discussion provides a rather interesting analysis of this particular speed-direction effect, it is important to point out that no information concerning the 'sidedness' of the individual subjects participating in the study was acquired. Therefore a test of the validity of such an explanation must necessarily await future research in this area. Such data as these do, however, suggest that we may need to begin to look more closely at the problem of sensory dominance and the role it plays in the performance of gross motor skills.

Speed of the Perceptual Response. The speed with which the visuo-perceptual judgment was made was dependent upon three factors: (a) the speed of the moving object; (b) the horizontal direction in which the object was traveling; and (c) the level of skill of the individual judging the moving object. (This latter effect will be discussed in a later section. See Problem II, p. 118.)

In general, objects traveling at a fast rate of speed were responded to significantly more quickly than were objects moving at a slower rate of speed. It is doubtful, however, that this represents the true effect of velocity of object flight upon the speed of the visuo-perceptual judgment. Rather, it is more likely a reflection of the instructions given to the subject and of the general experimental situation itself. Due to the nature of the experimental situation, when the object was traveling at a fast rate of speed, the individual was forced to cover a greater distance to get to the desired point of interception than when the object was traveling at a slow rate of speed. Since subjects were instructed to move 'just as though they were actually going to try to catch the ball', the question arises of whether or not the individual actually required a longer time to 'visually judge' the flight of the slow-moving object or if he simply waited longer before responding because he knew he had more time to reach the desired point of interception? As a result of this artifact in the experimental situation, no clear-cut statement concerning the effect of velocity of ball flight upon the speed of the visuo-perceptual response can be made.

The other factor which appeared to affect the speed of the visuo-perceptual response was the horizontal direction in which the object was traveling. In this case, objects moving to the right of the individual were responded to more quickly than objects moving to the left or directly at the individual. This indicated that, at least in the present study, individuals tended to make their judgments about the flight of the moving object more quickly when it was moving to the right than when it was moving in either of the other two horizontal directions. In connection with this, it should also be noted that judgments about the flight of objects moving horizontally to the right were always as accurate, if not more so, than judgments about objects moving to the left. This suggests that less time was needed by the individual to accurately process visual information derived from an object moving horizontally to the right than to process similar visual information derived from an object moving horizontally to the left. Why this should be so is, of course, puzzling. Although the writer is again inclined to speculate that such effects may, in part, be related to the 'sensory dominance' of the individual, that is, to whether or not the individual judging the flight of the moving object was predominantly a 'right-sided' or a 'left-sided' individual, there is little or no evidence presently available to support such an assertion.

Problem II. Do highly-skilled and poorly-skilled individuals differ in their capacity to visually judge the flight of a moving object in space?

There is little doubt that skilled motor performance involves, in the final analysis, complex interactions among the various physiological systems of the body. From an information processing point of view, however, an important part of the performance of any motor behavior is the effective processing of sensory information basic to the performance of that behavior. If this is true, then one of the things that should differentiate between the highly-skilled and the poorly-skilled individual is the capacity to process, rapidly and accurately, sensory information pertinent to the successful performance of a given motor act.

Data from the present study strongly support such an assertion. For example, individuals classified as 'skilled' were, without exception, significantly more accurate than individuals classified as 'unskilled' in visually judging the flight of a moving object in space. In terms of the speed with which such judgments were made, the perceptual responses of the skilled individual were always significantly faster than those of the unskilled. Such findings as these do suggest, then, that the skilled individual may be able to process incoming sensory information at a faster rate and with a greater degree of accuracy than can the unskilled. In other words, it may be that the highly-skilled performer does, in fact, possess a sensori-perceptual mechanism that is superior to that of the unskilled performer.

It is also interesting to note that in two instances (radial and distance deviation measures), there was a significant interaction between the level of skill of the individual and the accuracy with which certain combinations of visual cues were judged. In both cases, the nature of the interaction was such that it pointed to some interesting differences between the skilled and the unskilled individual in terms of their respective abilities to accurately judge the flight of a fast-moving object in space. In general, skilled individuals were able to judge the flight of a fast-moving object equally well regardless of the vertical direction of its flight. However, the precision with which unskilled individuals judged the flight of a fast-moving object was significantly affected by the vertical direction in which the object was moving. Furthermore, when the object being judged was moving at a slow rate of speed, no such skill effect was observed. Although much more definitive work needs to be done in this area, these results indicated that not only was the skilled individual more accurate, in general, in his judgment of the moving object in space but that he was also capable of handling certain complex kinds of sensory information more easily than was the unskilled individual. This suggests of course that in many instances the differences in the sensori-perceptual capacities of the skilled and unskilled individual may be very subtle ones.

Problem III. What is the effect of age or maturity level upon the speed and accuracy with which the individual judges the flight of a moving object in space?

One of the things which is believed to characterize the growth and development of the perceptual apparatus of the individual, and particularly of the young child, is an increase in the capacity for processing complex sensory information with greater and greater efficiency. (8,45,101) In other words, it is believed that as the individual matures, his perceptual apparatus becomes functionally more efficient. This enables him to process available sensory information more rapidly and accurately than before and thus he is able to make increasingly more accurate judgments about stimulus situations which confront him in his environment.

The results of the present investigation indicated, however, that age had no effect upon the speed or precision with which the individual responded to a moving object in space. That is, there were no significant differences among junior high, high school and college age males (average ages respectively: 12, 16, 20) in terms of the speed and accuracy with which they judged the flight of a moving object in three-dimensional space. (It should perhaps be noted that although there was some indication that the speed of the perceptual response was faster in the older age groups, these differences were not statistically significant.) In a recent study concerned with the development of visual perception in the young child, Williams (109) reported that visuo-perceptual abilities involved in judging the flight of a moving object in space appeared to be functionally mature at about eleven years of age. Since the average age of the youngest group studied in the present investigation was twelve, this may account for the fact that no significant age differences were found.

Some mention should be made of the significant interaction between age, speed and vertical direction of object flight (distance deviation). The presence of this interaction indicated that certain combinations of visual cues were more difficult for one age group to judge than another. In other words, although the age of the individual did not, in general, affect the accuracy of the perceptual response, there were instances when certain combinations of visual cues were being judged that age became important. However, as it now stands it would appear that the major part of the growth and development of the perceptual apparatus of the individual is completed by the time the individual reaches junior high school and that thereafter age has little or no effect upon the speed or accuracy with which the individual judges the flight of a moving object in space.

## CONCLUSIONS

The following conclusions are based upon a careful study and analysis of data from the present investigation.

(1) The speed and accuracy with which the flight of a moving object is judged is, to a large extent, dependent upon the specific set of visual cues involved, that is, upon the particular speed, horizontal and/or vertical direction in which the object is moving at the time it is being judged;

(2) Individuals classified as highly-skilled are significantly superior to individuals classified as poorly-skilled in visually judging the flight of a moving object in space; and

(3) Age, as represented by a sample of junior high, high school and college age males, has little or no effect upon the speed and accuracy with which the individual judges the flight of a moving object in three-dimensional space.

## SUGGESTIONS FOR FURTHER STUDY

1. Data from the present investigation indicated that certain combinations of visual cues were more difficult to judge (interpret) accurately than were certain others. If we are to enhance the degree of success experienced by the individual in learning and/or performing certain gross motor skills, then we need to begin to identify more specifically the kinds of visual cues involved in the performance of such motor skills and to evaluate them in terms of the kinds of demands which they place upon the sensori-perceptual apparatus of the individual.
2. If the apparent differences in visuo-perceptual capacities of the highly-skilled and the poorly-skilled sports performer do exist, it is important to establish whether or not such differences are innate ones or if the 'potentially' unskilled individual can be trained to use his visuo-perceptual apparatus more effectively through properly planned and appropriately timed perceptual-motor experiences.
3. Evidence from the present study tended to support the notion that the growth of the visuo-perceptual mechanism of the individual

was nearly complete by the age of twelve. This points to an obvious need to outline the pattern of growth of such capacities in the young child and to develop new methods and techniques for improving or enhancing the development of such capacities.

## BIBLIOGRAPHY

1. Ayres, A. Jean. "Patterns of Perceptual-Motor Dysfunction in Children: A Factor Analytic Study," *Perceptual-Motor Skills* 20: 335-68, 1965.

2. Baldwin, Robert D., Davis J. Chambliss and A. Dean Wright. "Target Detectability as a Function of Target Speed, Noise Level, and Location," *Journal of Applied Psychology* 46: 26-30, 1962.

3. Bandzejova, Maria. "Reaktivita v zavislosti od poloky podnetu v zrakovom poli," (Reaction Time as a Function of the Stimuli Position in the Visual Field) *Psychologica* 16: 179-212, 1965.

4. Banister, H. and J.M. Blackburn. "An Eye Factor Affecting Proficiency in Ball Games," *British Journal of Psychology* 21: 382-84, 1931.

5. Barclay, George Davis. "The Relationship Between Efficient Vision and Certain Sensory Motor Skills." Unpublished Doctoral dissertation, New York University, New York, 1938.

6. Beck, Jacob. "Age Differences in Lightness Perception," *Psychonomic Science* 4: 201-202, 1966.

7. Bennett, Edward M. *Human Factors in Technology*. New York: McGraw Book Company, 1963.

8. Birch, H.G. and Arthur Lefford. "Intersensory Development in Children," *Monograph of Sociological Research and Child Development* 28: 2-47, 1963.

9. Bitterman, M.E. "Phyletic Differences in Learning," *American Psychologist* 20: 396-410, 1965.

10. Bortner, M. and H.G. Birch. "Perceptual and Perceptual-Motor Dissociation in Cerebral Palsied Children," *Journal of Nervous and Mental Disorders* 134: 103-108, 1962.

11. Bower, T.G. "The Visual World of Infants," *Scientific American* 215: 80-97, 1966.

12. Braine, L.G. *Mind, Perception, and Science*. Oxford: Blackwell Scientific Publications, 1951.

13. Brown, Donald, James Naylor, and Kenneth H. Michels. "Perception of Real Movement as a Function of Angle of Approach," *American Journal of Psychology* 75: 144-46, 1962.

14. Brown, J.F. "The Thresholds for Visual Movement," *Psychological Forschung* 14: 249-68, 1931.

15. Brown, R.H. and J.E. Conklin. "The Lower Thresholds of Visible Movement as a Function of Exposure Time," *American Journal of Psychology* 67: 104, 1954.

16. Bruce, Russell. "The Effects of Variations in Ball Trajectory upon the Catching Performance of Elementary School Children." Unpublished Doctoral dissertation, University of Wisconsin, Madison, 1966.

17. Carlson, V.R. "Adaptation in the Perception of Visual Velocity," Journal of Experimental Psychology 64: 192, 1962.

18. Carr, Harvey A. "Influence of Vision in Acquiring Skill," Journal of Experimental Psychology 5: 301-11, 1922.

19. Carr, Harvey A. An Introduction to Space Perception. New York: Longmans Green, 1935.

20. Clark, B. and N. Warren. "Depth Perception and Interpupillary Distance as Factors in Proficiency in Ball Games," American Journal of Psychology 47: 485-87, 1935.

21. Corah, Norman L. "Effects of the Visual Field upon Perception of Change in Spatial Orientation," Journal of Experimental Psychology 70: 598-601, 1965.

22. Cratty, Bryant. Movement Behavior and Motor Learning. Philadelphia: Lea & Febiger, 1964.

23. Damron, Frazier C. "A Comparative Study of Two-Dimensional Slides in Teaching Recognition of Fundamental Football Defenses in High School Football Players." Unpublished Doctoral dissertation, University of Indiana, Bloomington, 1952.

24. Fleischman, Edwin A. "A Comparative Study of Aptitude Patterns in Unskilled and Skilled Psychomotor Performances," Journal of Applied Psychology 41: 263-72, 1957.

25. Fleischman, Edwin A. and Walter E. Hempel, Jr. "Changes in Factor Structure of a Complex Psychomotor Test as a Function of Practice," Psychometrika 19: 239-52, 1954.

26. Fleischman, Edwin A. and Walter E. Hempel, Jr. "Factorial Analysis of Complex Psychomotor Performance and Related Skills," Journal of Applied Psychology 40: 96-104, 1956.

27. French, Robert S. "Pattern Recognition in the Presence of Visual Noise," Journal of Experimental Psychology 47: 27-31, 1954.

28. Gemelli, A. "The Visual Perception of Movement," American Journal of Psychology 75: 144-46, 1962.

29. Gerhard, D.J. "The Judgment of Velocity and Prediction of Motion," Ergonomics 2: 287-304, 1959.

30. Gesell, Arnold, Frances L. Ilg and Glenna E. Bullis. Vision: Its Development in Infant and Child. New York: Paul B. Heober, Inc., 1949.

31. Gibson, E.J. "Development Study of Visual Search Behavior," Perception and Psychophysics 1: 169-71, 1966.

32. Gibson, E.J. and R.D. Walk. "The Visual Cliff," Scientific American 202: 67-71, 1960.

33. Gibson, J.J. "Motion Picture Testing and Research," U.S. Army Air Force, Aviation Psychology Research Program Report No. 7, 1947.

34. Gibson, J.J. The Perception of the Visual World. Boston: Houghton Mifflin Co., 1950.

35. Gogel, Walter C. "Perception of the Relative Distance Position of Objects as a Function of Other Objects in the Field," *Journal of Experimental Psychology* 47: 335-42, 1954.

36. Goldstein, A.G. "Judgments of Visual Velocity as a Function of Length of Observation Time," *Journal of Experimental Psychology* 54: 457-61, 1957.

37. Goldstein, Jacob and Charles Weiner. "On Some Relations Between Perception of Depth and of Movement," *Journal of Psychology* 55: 3-23, 1963.

38. Gottsdanker, Robert M. "The Accuracy of Motion Prediction," *Journal of Experimental Psychology* 43: 26-36, 1952.

39. Gottsdanker, Robert M. "Assessment of Motion as Influenced by Structure of Background," *Scandinavian Journal of Psychology* 3: 122-28, 1962.

40. Gottsdanker, Robert M. "A Further Study of Motion Prediction," *American Journal of Psychology* 68: 432-37, 1955.

41. Gottsdanker, Robert, James W. Grick and Robert B. Lockard. "Identifying the Acceleration of Visual Targets," *British Journal of Psychology* 52: 31-42, 1961.

42. Graham, C.H. "Visual Perception," In Stevens, S.S. (Ed.) *Handbook of Experimental Psychology*. New York: Wiley and Sons, 1951.

43. Granit, Ragnar. *Receptors and Sensory Perception*. New Haven and London: Yale University Press, 1962.

44. Graybiel, A. et al. "Accomodation, Visual Fields, Ocular Muscle Balance and Depth Perception of Athletes," *Research Quarterly* 26: 480, 1955.

45. Gregory, R.L. *Eye and Brain, the Psychology of Seeing*. New York: McGraw-Hill Book Company, Inc., 1966.

46. Haith, Marshall M. "The Response of the Human Newborn to Visual Movement," *Journal of Experimental Child Psychology* 3: 235-43, 1966.

47. Harris, Charles S. "Adaptation to Displaced Vision: Visual, Motor, or Proprioceptive Change?" *Science* 140: 812-13, 1963.

48. Harris, Chester W. "Statistical Methods," In Harris, C.W. (Ed.) *Encyclopedia of Educational Research*. New York: Macmillan, 1960.

49. Hays, William L. *Statistics for Psychologists*. New York: Holt, Rinehart and Winston, 1965.

50. Held, Richard. "Plasticity in Sensory-Motor Systems," *Scientific American* 213: 84-97, 1965.

51. Held, Richard and Alan Hein. "Adaptation of Disarranged Hand-Eye Coordination Contingent upon Re-Afferent Stimulation," *Perceptual-Motor Skills* 8: 87-90, 1958.

52. Held, Richard and Alan Hein. "Movement Produced Stimulation in the Development of Visually Guided Behavior," *Journal of Comparative Physiological Psychology* 56: 872-76, 1963.

53. Hoepner, Barbara J. "Comparison of Motor Ability, New Motor Learning, and Adjustment to a Rearranged Visual Field." Unpublished Doctoral dissertation, Pennsylvania State University, University Park, 1963.

54. Hubbard, A.W. "Psychological Aspects of Human Movement and Perception," *College Physical Education Association Proceedings*: 58-67, 1956.

55. Hubbard, A.W. and C.N. Senge. "Ball Speeds and Effect on Batting Movement," *Research Quarterly* 25: 42, 1954.

56. Jeffrey, W.E. "Discrimination of Oblique Lines by Children," *Journal of Comparative Physiological Psychology* 62: 154-56, 1966.

57. Johansson, G. "Configurations in the Perception of Velocity," *Acta Psychologica* 7: 25-79, 1954.

58. Jones, Lyle V. "Some Illustrations of Psychological Experiments Designed for Multivariate Statistics." Psychometric Laboratory, University of North Carolina, November, 1960.

59. Kabrick, John L. "Effects of Physical Location of Visual Stimulati on Intentional Response Time," *Journal of Engineering Psychology* 4: 1-8, 1965.

60. Kaiser, Peter K. "Investigation of Shape at a Slant," *Proceedings of Seventy-Fourth Annual Convention of the American Psychological Association*: 9-10, 1966.

61. Kalmus, H. "Inherited Sense Defects," In Stanley Coopersmith (Ed.) *Frontiers of Psychological Research*. San Francisco: W.H. Freeman and Company, 1966.

62. Katsui, A. "A Developmental Study on the Perception of Direction in Two-Dimensional Space," *Japanese Journal of Psychology* 23: 63-70, 1962.

63. Keller, L.F. "The Relation of 'Quickness of Bodily Movement' to Success in Athletics," *Research Quarterly* 13: 146-55, 1942.

64. Kerlinger, Fred N. *Foundations of Behavioral Research*. New York: Holt, Rinehart and Winston, Inc., 1966.

65. Kimble, G.A. *Hilgard and Marquis*: *Conditioning and Learning*. New York: Appleton-Century-Crofts, 1961.

66. Kreiger, Carol Jane. "The Influence of Figure-Ground Perception on Spatial Adjustment in Tennis." Unpublished Master's thesis, The University of California, Los Angeles, 1962.

67. Kretchmar, R.T. "Vision in Sports," *Research Quarterly* 20: 238, 1949.

68. Kurke, Martin I. "Role of Motor Experience in the Visual Discrimination of Depth," *Journal of Genetic Psychology* 86-87: 191-96, 1955.

69. Lit, Alfred and Harlyn D. Hamm. "Depth-Discrimination Thresholds for Stationary and Oscillating Targets at Various Levels of Retinal Illuminance," *Journal of the Optical Society of America* 56: 510-16, 1966.

70. London, I. "A Russian Report on the Post-Operative Newly Seeing," *American Journal of Psychology* 73: 478-82, 1960.

71. Matin, Leonard and George Kebler. "Acuity of Visual Perception of Direction in the Dark for Various Positions of the Eye in the Orbit," *Perceptual-Motor Skills* 22: 407-20, 1966.

72. McCloy, C.H. "Spatial Relations as a Factor in Motor Educability," *Research Quarterly* 11: 33, 1940.

73. McCormick, Ernest James. Human Engineering. New York: McGraw-Hill Book Company, 1957.

74. Miller, Donna Mae. "The Relationship between Some Visual-Perceptual Factors and the Degree of Success Realized by Sports Performers." Unpublished Master's thesis, University of Southern California, Los Angeles, 1960.

75. Morgan, Clifford T. "Some Structural Factors in Perception," In Deardslee, David C. and Michael Wertheimer, Readings in Perception. Princeton: D. Van Nostrand Co., Inc., 1958.

76. Mortimer, Elizabeth M. "Basketball Shooting," Research Quarterly 22: 234-43, 1951.

77. Mueller, Conrad G. Sensory Psychology. Englewood Cliffs: Prentice-Hall, Inc., 1965.

78. Mussen, Paul H. The Psychological Development of the Child. Englewood Cliffs: Prentice-Hall, Inc., 1965.

79. Nelson, T.M. "A Study Comparing Visual and Visual-Motor Perceptions of Unimpaired, Defective, and Spastic Cerebral Palsied Children," Journal of Genetic Psychology 101: 299-332, 1962.

80. Notterman, J. M., G.A. Cicala and D.C. Page. "Demonstration of the Influence and Response Categories of Difference Limens," Science 131: 983-84, 1960.

81. Olsen, E.A. "Relationship between Psychological Capacities and Success in College Athletics," Research Quarterly 27: 79, 1956.

82. Overton, Willis and Morton Wiener. "Visual Field Position and Word-Recognition Threshold," Journal of Experimental Psychology 71: 249-53, 1966.

83. Pierson, William R. "Comparison of Fencers and Non-Fencers by Psychomotor, Space Perception, and Anthropometric Measures," Research Quarterly 27: 90, 1956.

84. Rao, C.R. Advanced Statistical Methods in Biometric Research. New York: Wiley and Sons, 1952.

85. Rochlin, Alan M. "The Effect of Tilt on the Visual Perception of Parallelness," American Journal of Psychology 68: 223-236, 1955.

86. Reisen, A. "Arrested Vision," Scientific American 183: 16-19, 1950.

87. Reisen, A. "The Development of Visual Perception in Man and Chimpanzee," Science 106: 107-108, 1947.

88. Rey, A. "La Perception d'un Ensemble de Displacements," Rev int Filmol: 75-92, 1954.

89. Roy, S.N. Some Aspects of Multivariate Analysis. New York: Wiley and Sons, 1957.

90. Seigel, A.I. "A Motor Hypothesis of Perceptual Development," American Journal of Psychology 66: 301-304, 1953.

91. Sherman, Hoytl L. "Aspects of Visual Perception and Their Relationship to Motor Activity," College Physical Education Association Proceedings: 8-16, 1950.

92. Smith, K.U. and W.M. Smith. *Perception and Motion*. Philadelphia: Saunders Co., 1962.

93. Snyder, F.W. and N.H. Pronko. *Vision with Spatial Inversion*. Wichita: University of Wichita Press, 1952.

94. Solomon, Philip et al (Eds.) *Sensory Deprivation*. A Symposium held at Harvard Medical School. Cambridge, Mass: Harvard University Press, 1961.

95. Stallings, Loretta M. "The Role of Visual-Spatial Abilities in the Performance of Certain Motor Skills." Unpublished Doctoral dissertation, University of Texas, Austin, 1965.

96. Stroup, F. "Relationship Between Measurements of Field of Motion Perception and Basketball Ability in College Men," *Research Quarterly* 28: 72, 1957.

97. Tagaki, K. "On Visual Estimation of Length of Various Curves," *Japanese Journal of Psychology* 1: 476-98, 1926.

98. Tussing, Lyle. "The Effects of Football and Basketball on Vision," *Research Quarterly* 11: 16-18, 1940.

99. Updegraff, Ruth. "The Visual Perception of Distance in Young Children and Adults: a Comparative Study," *University of Iowa Studies in Child Welfare* 4, No. 4, 1930.

100. Valle, Louis D., T.G. Andrews and Sherman Ross. "Perceptual Thresholds of Curvilinearity and Angularity as Functions of Line Length," *Journal of Experimental Psychology* 51: 343-47, 1956.

101. Van Waters, Ralph O. "Visual Perception of Horizontal Movement," *Journal of Experimental Psychology* 17: 223-45, 1934.

102. Vernon, M.D. *The Psychology of Perception*. Harmondsworth, Middlesex: Penquin Books Ltd., 1962.

103. Von Senden, M. *Space and Sight*. Glencoe, Ill.: The Free Press, 1960.

104. Walchi, Richard M. "The Perception of Velocity," *Connecticut College Psychology Journal* 1: 19-38, 1964.

105. Walk, R.D., Samuel Trychin and Bernard Z. Karmel. "Depth Perception in the Dark-Reared Rat as a Function of Time in the Dark," *Psychonomic Science* 3: 9-10, 1965.

106. Weine, Paul and Richard Held. "Changes in Perceived Size of Angles as Function of Orientation in the Frontal Plane," *Journal of Experimental Psychology* 71: 55-59, 1966.

107. Wenger, M.S., F.N. Jones and M.H. Jones. *Physiological Psychology*. New York: Holt, Rinehart and Winston, 1956.

108. Wiener, Earl L. "Motion Prediction as a Function of Target Speed and Duration of Presentation," *Journal of Applied Psychology* 46: 420-24, 1962.

109. Williams, Harriet G. "The Perception of Moving Objects by Children." Unpublished manuscript, University of Toledo [illegible]7.

110. Wilson, Paul D. and A.H. Reisen. "Visual Development in Rhesus Monkeys Neonatally Deprived of Patterned Light," Journal of Comparative Physiological Psychology 61: 87-95, 1966.

111. Winer, B.J. Statistical Principles in Experimental Design. New York: McGraw-Hill Book Company, 1962.

112. Winograd, Samuel. "The Relationship of Timing and Vision to Baseball Performance," Research Quarterly 13: 481-93, 1942.

113. Wohwill, Joachim. "Developmental Studies of Perception," Psychological Bulletin 57: 249-88, 1960.

114. Wooldridge, Dean E. The Machinery of the Brain. New York: McGraw-Hill Book Company, Inc., 1963.

115. Wooster, M. "Certain Factors in the Development of a New Spatial Coordination," Psychological Monographs 32, No. 4: 146, 1923.

# APPENDICES

# APPENDIX A

## SUBJECT INSTRUCTIONS

Instructions to the subject were as follows:

"We are going to shoot a number of tennis balls from the Tennis-Ball Boy machine which you see here. (Subject was shown the Tennis-Ball Boy machine.) You will only be able to see a part of the flight of each of these balls. (Subject and Experimenter walked back to starting point under the canvas.) Based upon what you see, we want you to decide where you should go in order to catch the ball as you might actch a fly ball if you were playing a game of baseball. Once you have decided where to go, move to that spot, just as though you were actually going to try to catch the ball. Attempt to catch each ball at chest height with the body in an upright position and the arms in close to the body. (Subjects were shown the catching position.) In other words we don't want you to have to reach or stretch in any direction to catch the ball but rather try to position yourself so that you are directly under the ball when you catch it. Do you have any question?"

"You will start each trial from this same point under the canvas. You may stand with either foot on the footpad. (Subject was shown footpad and how to place his foot on it.) At the beginning of each trial, the Experimenter will say 'Ready?' On this signal, you will step onto the footpad and shortly thereafter, the ball will be projected from the machine."

"Stay as relaxed as you can. Watch each ball for as long as you need to to make your decision about where to go to catch it. Try to make this decision just as soon as you can. When you know or think you know where to go, move quickly into position to catch the ball. Once you have reached your 'selected' spot, stay there until you are instructed to go back to your original starting position." Now do you have any questions?"

If the subject had questions, they were clarified. Three prctice trials, using speeds and angles of projection not involved in the study, were then given to each subject to be sure that the subject understood the nature of the task he was to perform. Again any questions which the subject had relating to the performance of the task were answered.

# LAFAYETTE DEPTH PERCEPTION APPARATUS*

## Description

The apparatus consisted of two rods suspended within an enclosed wooden framework. The adjustance rods could be moved back and forth by manipulating a cord attached to the rod guides. The apparatus was lighted from within to provide uniformly diffused illumination. A centimeter scale located on the top of the apparatus provided the means by which the distance between the two rods was measured.

## Procedure

The subject, seated on a chair twenty feet from the depth perception apparatus, was instructed to manipulate the cord until the two black rods in the box appeared to him to be parallel to each other in space. The distance between the two rods was then measured in centimeters. A total of three trials was given. The score was the mean of the three trials.

*Lafayette Instrument Co., Lafayette, Indiana

## OVERARM THROW FOR VELOCITY

The subject stands behind a starting line which is 50 feet from the wall (a 30-foot distance was used for the junior high subjects). The subject throws the softball at a wall which is marked horizontally into one foot areas. The time of the throw, from release to contact with the wall, and the height of the wall contact are recorded for each trial. From these data, in addition to knowing the height of the subject, the velocity of the throw is read from a table which was prepared by procedures described by Mortimer (45). The total score for each subject was the average of four trials.

Sample from Velocity Table

| DIFFERENCE IN HEIGHT* | TIME Seconds | ANGLE Degrees | VELOCITY Feet/Sec |
|---|---|---|---|
| 0 | .80 | 18.93 | 39.64 |
| 0 | .81 | 19.37 | 39.26 |
| 0 | .82 | 19.81 | 38.88 |
| -2 | .66 | 9.47 | 46.08 |
| -2 | .67 | 9.86 | 45.44 |
| -2 | .68 | 10.26 | 44.83 |
| 3 | .95 | 30.27 | 36.56 |
| 3 | .96 | 30.70 | 36.34 |
| 3 | .97 | 31.14 | 36.13 |

*Difference in height = difference between subject's height and height of wall contact.

Canvas. The canvas was suspended from a series of large metal volleyball standards placed at ten foot intervals along the length of the canvas on both sides. A system of roped and wire pulleys was devised to enable the canvas to be pulled taut at the desired ten-foot height.

Rotatory Platform. Heavy metal braces were placed on the underside of the platform in such a way as to allow the machine to be rotated exactly five degrees to the right and five degrees to the left.

An enlarged protractor was placed on the floor under the pivotal device to confirm the accuracy of the placement of the metal brackets.

## DISTRIBUTION OF AVERAGE OF FOUR TRIALS ON THE THROW FOR VELOCITY TEST
(Measured in feet per second)

### JUNIOR HIGH

71.26*
69.55
67.54
67.23
67.14*
65.77*
64.17*
62.75
62.73*
62.23
62.23
61.04
60.45*
60.02
59.37
59.24
58.60
57.87
57.58
56.78
56.76*
56.38
56.13
55.33
54.35
54.24
54.10
54.07
53.77
53.53
53.44*
53.04
52.96
52.89
52.78
52.33
52.33
51.82
51.62*
51.55
51.45
51.27
51.13
50.70
50.60
50.58
50.20
50.07
49.55
49.52
49.51
49.04
47.97
47.60
47.39
47.23
46.51
46.21
45.40
45.32
45.21
44.63
44.63
43.86
43.41
42.96**
42.79
42.68
42.67
42.56**
42.14
41.99**
41.65**
41.56**
40.21**
39.76**
37.16
36.76**
35.58
34.42**

### HIGH SCHOOL

120.68*
115.33*
109.92
108.48*
102.91
101.07
100.88*
100.38*
100.27
100.15*
100.15
100.10*
99.62
98.68*
96.15
95.90
94.39
93.97
93.22
92.63
91.57
91.46*
91.30
90.69
90.26
90.04
90.00
89.67
87.97
87.66
87.65
87.31
86.23
86.21
85.76
85.68
85.41
84.55
84.39
82.69
82.22
81.34
81.33
81.04
80.68
79.97
79.92
79.84
79.16
78.97
77.83
76.21
75.77
75.31
74.35
73.88
72.75
72.45
72.15**
71.68
71.56
71.15
71.06
71.03**
69.96
68.93**
68.75
67.65
64.75**
64.27
62.44**
61.90
56.70**
55.39**
53.53
52.98
52.85
52.84**
46.37**

### COLLEGE

110.32*
108.17*
106.79*
104.84*
103.42*
102.37
98.11*
95.86*
93.72*
87.99*
85.49
85.14
79.27
79.25
79.08
78.95
77.19
76.12
75.99
75.19
74.84
74.54
74.42
74.36
74.09
74.08
73.88
72.76
71.85
71.62
71.28
70.64**
69.61
69.48
68.90
68.65
67.76**
66.94
65.50**
65.40**
65.33
65.15
61.60**
59.62**
51.06**
45.95**
44.11**

*	High-skilled category
**	Low-skilled category

# INFORMATION SHEET

Name______________________________
Age__________

1. Do you play varsity baseball? Yes____ No_____
2. If yes, what position? _____________________________________________
3. Do you play any sports at the varsity level? Yes ____ No ____
4. If Yes, which ones? List below.
   a. ___________________________
   b. ___________________________
   c. ___________________________
   d. ___________________________
   e. ___________________________
5. Do you or have you played softball or baseball in any organized form? (local or community leagues, etc.) Yes ____ No _____
6. If yes, for how many years or seasons? _________________

   What position? _________________
7. What sports or physical activities, if any, are you most active in?
   a. ___________________________
   b. ___________________________
   c. ___________________________
   d. ___________________________
   e. ___________________________

## CHARACTERISTICS OF SELECTED SUBJECTS

| SUBJ. NO. | AGE | HEIGHT | VISUAL ACUITY | DEPTH PERCEP-TION | AVE. VELO-CITY |
|---|---|---|---|---|---|
| 0111 | 12 | 4'10" | 20/20 | -3.0 | 65.77 |
| 0211 | 13 | 5' 2" | 20/40 | 3.6 | 67.14 |
| 0311 | 13 | 5' 2" | 20/20 | 2.8 | 51.62 |
| 0411 | 13 | 5'11" | 20/25 | 1.5 | 62.73 |
| 0511 | 13 | 5' 4" | 20/20 | 1.6 | 64.17 |
| 0611 | 13 | 5' 2" | 20/20 | 3.6 | 53.44 |
| 0711 | 13 | 5' 8" | 20/20 | 1.6 | 56.76 |
| 0811 | 12 | 5' 5" | 20/20 | -4.6 | 71.26 |
| 0911 | 12 | 5' 4" | 20/40 | 2.8 | 60.45 |
| 1012 | 13 | 5' 6" | 20/20 | 1.8 | 41.65 |
| 1112 | 13 | 5' 0" | 20/25 | 1.8 | 34.42 |
| 1212 | 13 | 5' 6" | 20/20 | 4.2 | 36.76 |
| 1312 | 13 | 6' 0" | 20/25 | 3.5 | 41.99 |
| 1412 | 12 | 5' 0" | 20/20 | 3.0 | 41.56 |
| 1512 | 13 | 5' 6" | 20/20 | 3.7 | 39.76 |
| 1612 | 13 | 5' 1" | 20/20 | 1.4 | 42.56 |
| 1712 | 12 | 4' 6" | 20/25 | .8 | 40.21 |
| 1812 | 13 | 5' 4" | 20/20 | 1.9 | 42.96 |
| 1921 | 15 | 5' 8" | 20/25 | 3.8 | 100.38 |
| 2021 | 16 | 5' 9" | 20/20 | 2.0 | 100.10 |
| 2121 | 15 | 5' 7" | 20/20 | 0 | 115.33 |
| 2221 | 15 | 5' 8" | 20/20 | 3.8 | 98.68 |
| 2321 | 15 | 5' 7" | 20/30 | 4.1 | 108.48 |
| 2421 | 16 | 5' 9" | 20/30 | 2.6 | 91.46 |
| 2521 | 15 | 6' 0" | 20/25 | 2.2 | 120.68 |
| 2621 | 16 | 5' 9" | 20/20 | 3.4 | 100.88 |
| 2721 | 16 | 5' 8" | 20/25 | 1.2 | 100.15 |
| 2822 | 15 | 6' 1" | 20/30 | 2.0 | 71.03 |
| 2922 | 15 | 5' 5" | 20/40 | 3.5 | 72.15 |
| 3022 | 17 | 5' 8" | 20/40 | .8 | 52.84 |
| 3122 | 16 | 5' 7" | 20/20 | 2.5 | 68.93 |
| 3222 | 15 | 5' 5" | 20/20 | 4.9 | 64.75 |
| 3322 | 16 | 5' 8" | 20/30 | 3.1 | 56.70 |
| 3422 | 16 | 5' 3" | 20/40 | 1.7 | 46.37 |
| 3522 | 16 | 5' 9" | 20/30 | 2.1 | 55.39 |
| 3622 | 16 | 5' 6" | 20/30 | 1.1 | 62.44 |
| 3731 | 20 | 5' 7" | 20/20 | 4.4 | 95.86 |
| 3831 | 19 | 6' 0" | 20/20 | 1.7 | 93.72 |
| 3931 | 20 | 5'11" | 20/20 | 1.1 | 97.98 |
| 4031 | 21 | 6' 1" | 20/20 | 3.5 | 104.84 |
| 4131 | 19 | 6' 1" | 20/20 | 1.8 | 103.42 |
| 4231 | 21 | 5'11" | 20/20 | 3.5 | 98.11 |
| 4331 | 20 | 5'11" | 20/20 | .8 | 106.79 |
| 4431 | 19 | 5' 9" | 20/20 | 2.4 | 108.17 |
| 4531 | 19 | 5' 8" | 20/20 | 2.1 | 110.32 |

CHARACTERISTICS OF SELECTED SUBJECTS (CONT'D)

| SUBJ. NO. | AGE | HEIGHT | VISUAL ACUITY | DEPTH PERCEP- TION | AVE. VELO- CITY |
|---|---|---|---|---|---|
| 4632 | 19 | 5' 9" | 20/20 | -2.4 | 65.50 |
| 4732 | 20 | 6' 0" | 20/20 | 3.1 | 51.06 |
| 4832 | 18 | 6' 0" | 20/20 | 3.9 | 67.76 |
| 4932 | 18 | 5'10" | 20/20 | 1.1 | 70.64 |
| 5032 | 18 | 5'11" | 20/20 | 2.1 | 65.15 |
| 5132 | 19 | 6' 0" | 20/20 | 2.5 | 44.11 |
| 5232 | 18 | 5' 4" | 20/20 | 4.1 | 65.40 |
| 5332 | 19 | 5' 9" | 20/20 | 2.1 | 59.62 |
| 5432 | 18 | 6' 0" | 20/20 | 1.0 | 45.95 |

# APPENDIX B

## ORDER OF PRESENTATION OF EXPERIMENTAL CONDITIONS

| Subject 0111 | | Subject 0211 | | Subject 0311 | | Subject 0411 | |
|---|---|---|---|---|---|---|---|
| F-C-H | S-L-H | S-C-L | S-R-H | S-R-L | S-L-L | S-L-L | F-C-H |
| S-L-H | S-R-H | F-L-L | S-C-H | F-C-H | S-L-H | S-R-L | F-R-H |
| F-L-L | F-L-H | S-R-L | F-C-L | S-C-H | S-R-L | S-L-H | S-C-H |
| S-L-H | F-R-L | S-C-H | S-L-L | F-C-L | F-R-L | S-R-H | F-L-H |
| F-C-L | S-L-H | F-C-H | F-R-L | S-C-L | F-R-L | S-C-H | F-L-H |
| S-R-L | S-L-L | F-R-H | F-L-L | S-R-H | F-C-L | F-L-H | S-L-L |
| S-R-H | F-C-H | S-L-L | S-C-L | F-L-L | S-R-H | S-R-L | S-C-H |
| S-C-L | F-R-L | S-R-L | S-C-H | F-R-H | S-R-L | S-R-L | F-R-H |
| F-L-L | S-L-H | S-L-H | S-L-L | S-L-L | F-C-H | F-C-H | F-R-L |
| S-R-L | F-R-H | S-R-H | S-L-L | F-R-L | F-R-H | F-L-L | S-R-L |
| F-C-L | F-L-L | F-L-H | S-L-H | S-L-H | S-C-L | S-L-L | F-C-H |
| F-C-L | F-C-H | S-L-H | S-C-L | S-C-L | S-C-L | F-R-H | S-R-H |
| S-C-H | S-R-H | F-L-L | F-C-L | S-C-L | F-C-H | S-C-L | F-R-L |
| S-R-H | F-R-H | F-C-H | F-R-L | F-C-H | S-R-H | F-L-L | S-R-L |
| F-L-H | F-L-H | S-C-L | S-R-H | S-R-L | F-C-H | S-R-H | F-L-H |
| F-R-L | S-C-H | S-L-H | S-C-L | S-C-H | S-C-H | F-C-L | F-L-L |
| F-L-H | F-R-L | F-C-L | F-R-L | F-C-L | S-L-H | F-R-L | S-C-L |
| F-C-H | F-L-L | S-R-H | F-C-L | F-L-H | F-L-L | F-C-H | F-C-L |
| S-L-L | F-R-H | F-C-H | S-R-L | S-R-H | S-R-H | F-R-L | S-R-H |
| S-L-L | S-L-L | F-R-L | F-R-L | F-L-H | S-L-H | F-L-H | F-C-H |
| F-R-H | S-L-H | F-C-L | S-C-L | F-L-L | F-R-L | S-C-L | F-L-L |
| F-R-H | S-R-L | F-L-H | S-L-L | S-C-H | F-C-L | S-L-H | F-C-L |
| S-L-L | S-C-L | S-L-L | F-R-H | S-L-L | F-R-L | F-C-L | S-L-L |
| S-C-H | F-L-H | F-L-H | F-L-H | S-R-L | S-C-H | S-C-H | F-R-L |
| S-C-L | F-C-H | S-C-H | F-R-H | S-L-L | S-L-H | S-C-L | S-R-L |
| F-L-L | S-R-L | S-R-L | S-L-H | S-L-H | F-R-H | F-R-L | F-C-H |
| S-C-L | F-R-H | S-C-L | F-R-H | S-L-H | S-L-L | S-R-L | S-L-L |
| F-R-L | S-L-L | F-R-H | S-L-H | S-C-L | S-R-L | S-L-L | S-L-L |
| F-L-H | F-L-H | F-R-L | F-R-H | S-R-H | F-C-L | F-R-H | S-C-H |
| S-L-L | S-L-L | F-L-L | F-C-L | S-C-H | S-C-L | F-C-H | F-C-H |
| F-R-L | S-R-L | F-L-L | F-R-H | F-L-H | F-R-H | S-L-L | F-L-H |
| F-C-H | F-C-L | S-C-H | F-R-L | F-R-H | S-C-L | F-C-L | F-R-H |
| F-C-L | S-R-L | S-L-H | S-L-H | F-R-L | F-R-H | F-C-L | S-R-L |
| F-L-H | F-L-H | S-R-H | F-L-L | S-R-H | F-L-H | S-C-H | S-R-H |
| S-R-H | S-R-H | S-C-H | S-R-H | F-C-L | F-L-H | S-L-H | S-C-H |
| S-R-H | S-C-H | F-R-H | F-L-L | F-L-L | S-C-H | F-R-L | F-R-H |
| S-C-L | F-R-L | F-C-L | F-C-H | F-R-L | F-L-H | S-L-H | F-C-L |
| S-C-H | F-R-L | F-L-H | S-R-L | F-R-H | S-C-H | F-L-H | F-C-L |
| S-L-H | F-C-H | F-C-H | S-R-H | S-R-L | F-L-L | F-L-L | S-C-L |
| F-R-H | F-C-L | F-R-L | F-C-H | F-R-L | F-C-L | F-R-H | S-C-L |
| S-R-L | F-L-L | S-R-L | F-C-H | F-C-H | F-L-H | S-C-L | S-L-H |
| S-L-L | S-R-H | S-L-L | S-C-H | F-R-H | S-L-L | S-R-H | S-R-H |
| S-L-L | S-C-H | S-C-L | F-L-H | S-L-L | S-R-L | F-L-H | S-L-H |
| F-L-L | S-C-H | F-C-H | S-R-L | S-L-H | F-L-H | S-R-H | F-L-L |

## ORDER OF PRESENTATION OF EXPERIMENTAL CONDITIONS (CONT'D)

| Subject 0111 | | Subject 0211 | | Subject 0311 | | Subject 0411 | |
|---|---|---|---|---|---|---|---|
| F-C-H | F-C-L | F-C-L | F-L-H | F-C-L | F-L-L | F-L-L | S-L-H |
| S-L-L | F-C-L | S-L-L | F-L-L | F-C-H | F-L-L | F-R-L | F-L-L |
| S-L-H | F-L-L | S-C-H | S-R-L | S-L-L | S-R-H | S-L-H | F-L-H |
| S-R-L | S-C-H | S-R-H | F-L-H | F-C-H | F-L-L | S-C-L | S-C-H |

| Subject 0511 | | Subject 0611 | | Subject 0711 | | Subject 0811 | |
|---|---|---|---|---|---|---|---|
| F-R-L | S-L-L | S-R-L | F-R-L | S-C-H | F-R-L | F-R-L | F-R-L |
| S-R-L | S-R-L | S-R-L | F-L-H | S-C-L | S-R-L | S-C-L | F-C-H |
| F-C-L | F-R-H | F-C-L | F-R-H | F-L-L | S-L-H | F-R-H | F-C-H |
| F-R-L | S-R-L | S-C-H | S-L-H | F-L-H | F-R-L | S-L-H | S-L-H |
| S-R-H | S-L-H | F-C-H | S-C-H | S-L-L | S-C-H | F-R-L | F-C-H |
| F-L-L | S-L-H | F-L-L | S-C-L | S-L-H | S-R-H | S-C-L | F-L-H |
| F-C-L | S-L-L | S-L-L | F-C-H | S-C-L | F-R-L | S-C-H | S-L-H |
| S-L-H | S-L-H | F-L-L | F-L-H | F-R-L | F-C-H | S-L-L | S-C-L |
| S-C-H | F-R-L | F-C-H | S-L-H | S-C-L | F-C-H | F-C-L | S-L-H |
| F-C-H | F-R-L | S-R-L | S-R-L | F-R-H | S-R-L | F-R-H | F-L-H |
| F-R-H | F-C-L | F-R-L | S-L-L | S-R-L | F-R-H | S-R-L | S-C-L |
| S-L-L | F-C-H | S-L-H | F-R-H | F-C-L | F-C-L | S-C-H | F-C-L |
| F-L-H | F-C-H | F-R-H | F-R-H | S-R-H | S-C-H | F-C-H | S-L-L |
| F-C-H | S-C-L | S-R-H | F-R-H | S-C-H | F-C-H | F-L-L | S-L-L |
| F-R-H | F-R-L | S-R-H | F-L-L | F-L-H | S-C-L | F-R-H | S-C-L |
| S-R-L | F-L-H | F-L-H | F-R-L | F-L-L | S-L-H | F-R-L | S-L-L |
| S-C-L | S-L-L | S-C-L | S-L-L | F-R-L | S-L-L | F-L-H | F-C-L |
| S-R-L | S-C-L | F-C-L | S-C-L | F-C-H | S-C-H | S-L-L | S-L-L |
| S-R-H | F-R-L | S-L-H | S-L-H | F-R-H | F-L-H | S-R-H | F-R-L |
| F-L-L | S-L-H | F-L-L | S-C-H | S-R-L | S-C-L | F-L-H | S-R-L |
| S-C-H | F-L-H | S-R-H | S-C-H | S-L-L | F-R-H | F-L-L | S-C-L |
| S-L-H | S-C-H | S-C-H | F-L-L | S-R-L | F-C-L | S-R-H | S-C-H |
| F-R-L | F-R-H | F-R-L | S-L-L | F-R-L | S-L-H | F-L-L | F-L-H |
| F-L-H | S-L-L | F-L-H | F-C-H | F-L-L | S-C-L | S-L-L | S-R-H |
| F-L-L | S-R-L | S-R-H | S-C-L | F-R-H | S-R-H | S-R-L | S-C-H |
| F-C-L | S-L-H | F-R-H | S-C-H | F-C-H | F-R-H | S-C-H | F-R-L |
| S-C-L | F-R-H | S-R-L | S-R-H | S-L-L | F-C-L | S-R-L | S-C-H |
| S-L-L | F-R-H | F-L-L | F-C-L | F-C-L | S-L-H | F-C-H | F-R-L |
| F-R-H | S-C-H | F-C-L | F-C-H | S-C-H | F-L-H | S-L-L | F-R-H |
| S-C-H | F-C-H | S-C-L | S-R-H | S-L-H | F-C-L | F-R-H | F-R-H |
| F-R-L | F-C-H | F-L-H | F-C-L | F-C-H | F-L-H | F-C-H | S-R-L |
| S-R-L | F-L-L | S-L-H | S-R-L | F-R-L | F-L-H | F-L-H | F-R-H |
| S-R-H | S-C-H | S-C-H | F-C-L | F-C-L | F-R-H | S-R-H | S-C-H |
| S-R-H | S-C-H | F-R-L | F-L-H | S-C-L | S-C-H | F-L-L | F-C-L |
| S-C-H | S-R-L | S-L-L | S-L-L | F-L-L | S-R-L | S-R-L | F-C-L |
| F-C-H | S-R-H | F-C-H | F-C-L | S-L-L | F-L-L | S-L-H | S-R-L |
| S-L-L | F-L-H | S-C-L | F-L-L | S-R-L | F-L-L | S-L-H | F-L-L |
| F-L-H | S-R-H | S-L-L | F-C-H | S-R-H | F-C-L | S-C-L | F-L-H |
| S-L-H | S-C-L | F-R-H | S-C-L | F-C-H | S-R-L | S-L-H | S-C-L |

## ORDER OF PRESENTATION OF EXPERIMENTAL CONDITIONS (CONT'D)

| Subject 0511 | | Subject 0611 | | Subject 0711 | | Subject 0811 | |
|---|---|---|---|---|---|---|---|
| F-L-H | S-C-L | F-C-L | F-L-L | F-L-H | F-L-L | F-C-L | F-L-L |
| F-L-L | F-L-L | F-R-L | S-R-H | S-R-H | S-R-H | F-R-L | S-R-H |
| S-C-L | F-L-L | S-C-L | S-R-H | S-L-H | F-L-H | F-C-L | S-R-L |
| F-R-H | S-R-H | F-R-L | F-C-H | S-L-H | S-R-H | S-L-H | F-L-L |
| F-C-L | S-R-H | S-L-L | F-L-H | S-C-L | S-L-L | F-C-H | S-R-H |
| F-C-L | F-L-L | F-R-L | F-L-H | F-C-H | S-L-L | S-C-H | S-R-H |
| F-L-H | S-C-L | S-L-H | S-R-L | F-R-L | S-L-L | F-R-H | F-L-L |
| F-C-L | F-C-L | F-R-H | S-R-L | S-C-H | S-R-H | F-L-H | S-R-H |
| F-C-H | S-L-L | S-L-H | S-C-H | F-R-H | F-L-L | F-C-L | F-C-H |

| Subject 0911 | | Subject 1012 | | Subject 1112 | | Subject 1212 | |
|---|---|---|---|---|---|---|---|
| S-C-L | S-C-H | F-R-H | F-C-L | F-R-L | S-R-L | S-R-L | S-C-L |
| S-L-L | S-L-H | F-L-H | S-C-L | F-C-H | F-C-H | S-L-H | S-C-H |
| F-R-H | F-R-L | S-R-L | S-C-H | F-R-L | F-C-H | F-C-H | F-R-H |
| F-R-H | F-C-L | S-L-L | S-C-H | S-R-L | F-C-H | S-L-L | S-L-L |
| F-L-L | S-R-L | F-L-L | F-R-H | F-R-L | S-R-L | S-R-L | S-R-L |
| S-C-H | S-C-L | S-R-H | F-R-L | F-R-L | F-C-L | F-C-L | S-L-H |
| F-R-L | F-C-L | F-C-H | F-L-L | S-C-L | S-L-L | F-L-L | F-R-H |
| S-R-L | F-R-L | S-C-L | F-R-L | S-C-L | F-C-L | F-R-H | S-L-L |
| F-C-H | S-C-L | F-R-L | F-R-H | S-L-H | F-C-H | F-C-H | S-R-L |
| S-L-H | S-R-L | F-R-H | S-L-H | F-R-L | F-C-H | S-C-L | S-R-H |
| S-C-H | S-R-L | F-C-L | S-R-L | F-L-L | S-R-L | F-L-L | S-C-H |
| F-L-H | S-L-H | S-C-H | F-C-L | S-L-L | S-L-H | S-R-H | F-C-L |
| F-L-H | S-C-H | F-L-H | S-L-L | S-L-H | F-R-H | F-R-L | F-L-H |
| F-C-L | S-C-L | F-L-H | F-C-L | F-L-H | F-R-L | F-R-H | F-L-L |
| S-R-H | F-R-H | F-R-L | F-R-H | S-L-H | F-L-L | F-L-L | F-L-H |
| S-R-H | S-C-H | S-L-L | S-L-L | S-C-L | S-L-H | F-C-L | S-C-H |
| S-C-L | S-R-L | S-R-L | S-C-H | S-C-L | F-R-H | F-L-H | F-R-H |
| F-L-H | S-C-H | F-C-H | F-L-H | S-C-H | S-C-H | S-C-H | S-L-L |
| S-L-L | F-C-L | S-L-L | F-C-L | F-C-L | F-L-L | S-R-H | S-C-L |
| F-R-L | S-L-H | S-C-H | S-L-L | F-R-H | F-C-L | S-L-H | F-C-L |
| F-R-H | F-C-H | S-L-H | F-L-L | F-L-L | S-L-L | S-R-H | F-C-L |
| S-L-H | F-L-H | S-C-L | S-L-H | S-R-L | S-C-H | S-R-L | S-C-L |
| S-L-H | F-C-L | S-R-L | S-C-H | F-R-H | S-R-H | F-R-L | S-C-H |
| S-R-L | F-R-L | S-L-H | S-L-L | F-C-L | F-L-H | S-C-H | S-C-L |
| S-R-H | F-L-H | S-C-L | S-C-L | S-R-H | F-L-H | F-R-H | F-L-H |
| S-C-L | F-R-L | F-L-L | S-L-H | F-C-L | S-R-H | S-L-L | S-L-L |
| S-C-H | S-L-L | S-C-H | S-C-L | F-L-H | S-C-L | S-C-L | S-C-L |
| F-C-H | S-L-L | F-R-H | S-C-L | F-L-H | S-L-H | S-R-L | F-C-L |
| F-L-L | S-L-L | F-C-H | F-L-L | S-L-L | F-C-H | F-L-H | F-C-H |
| S-L-L | S-C-H | S-L-H | S-L-H | S-L-H | S-R-L | F-R-L | F-C-L |
| S-L-H | S-R-H | S-L-L | F-C-H | F-L-H | F-R-H | S-C-H | S-R-L |
| F-C-H | F-R-H | F-C-L | F-R-H | S-C-L | F-R-L | S-L-H | S-C-H |
| F-C-H | F-C-H | S-C-L | F-L-H | F-C-L | S-C-L | S-L-H | S-L-H |
| S-R-L | F-R-H | F-C-H | F-R-L | F-L-L | S-L-H | S-R-H | S-R-L |

## ORDER OF PRESENTATION OF EXPERIMENTAL CONDITIONS (CONT'D)

| Subject 0911 | | Subject 1012 | | Subject 1112 | | Subject 1212 | |
|---|---|---|---|---|---|---|---|
| F-C-L | S-L-L | F-L-L | S-R-L | F-L-L | F-C-L | S-C-L | F-L-H |
| F-R-L | S-R-H | F-R-L | F-C-H | S-C-H | F-R-L | F-L-L | F-C-H |
| F-C-L | S-C-L | S-R-H | S-R-H | F-R-H | F-L-H | F-R-H | F-R-H |
| F-R-H | F-C-H | F-C-L | F-C-H | S-C-H | S-C-L | F-C-L | F-L-L |
| F-L-L | F-C-H | S-R-L | F-C-H | F-R-H | S-C-H | S-L-L | F-C-H |
| F-L-H | F-C-L | S-R-H | F-L-L | F-L-L | S-L-L | F-R-L | S-L-H |
| S-R-H | F-L-H | F-L-H | F-L-L | S-L-L | F-L-L | F-C-H | S-R-H |
| F-L-L | S-R-H | S-R-H | F-L-H | S-L-L | S-R-L | F-L-H | F-R-L |
| S-R-L | F-L-L | F-R-L | S-R-H | S-R-H | F-R-H | S-L-L | F-R-L |
| S-R-H | F-L-L | S-L-H | S-C-H | S-R-H | S-R-H | F-L-L | S-R-H |
| F-R-L | F-L-H | S-R-H | F-L-H | S-C-H | F-L-H | F-R-L | F-C-H |
| S-L-H | F-L-L | F-R-H | S-R-L | S-R-L | S-C-H | S-L-H | F-L-L |
| S-C-L | F-L-L | F-C-L | S-R-L | S-R-H | F-C-H | S-R-H | F-R-L |
| F-R-H | S-L-L | F-R-L | S-R-H | S-R-H | S-L-L | F-L-H | F-C-H |

| Subject 1312 | | Subject 1412 | | Subject 1512 | | Subject 1612 | |
|---|---|---|---|---|---|---|---|
| S-L-L | F-R-H | S-R-H | F-L-H | S-R-H | F-R-L | F-L-L | S-C-L |
| S-C-L | F-C-H | F-C-L | S-L-L | S-C-L | S-C-H | S-C-L | S-C-L |
| F-L-H | S-C-L | F-R-L | F-R-H | F-R-L | F-R-H | F-R-L | S-L-H |
| F-R-H | F-C-H | F-C-H | F-R-L | F-C-L | F-R-H | F-R-L | S-C-H |
| S-C-L | S-R-H | F-R-L | S-R-L | F-L-L | F-L-L | F-R-H | S-C-L |
| F-L-H | S-L-H | F-L-L | F-C-H | S-L-L | S-R-L | F-L-H | S-C-L |
| S-L-H | F-R-L | F-R-H | S-L-L | S-C-H | S-L-L | S-L-L | F-R-L |
| S-L-L | S-R-L | F-L-L | S-L-H | F-C-H | F-C-H | F-L-H | S-R-H |
| S-R-H | S-L-H | S-L-H | S-L-H | F-L-H | S-R-H | S-C-L | F-C-L |
| S-C-H | F-L-H | F-C-L | S-C-H | F-R-H | S-L-H | [illegible]-R-L | S-R-L |
| F-R-L | S-L-L | S-C-L | F-R-H | S-R-L | F-R-H | S-R-H | F-C-L |
| F-R-H | F-L-L | F-L-H | S-L-L | S-L-L | S-L-L | F-R-H | F-R-H |
| F-R-L | S-C-H | S-R-L | F-R-H | S-R-H | S-L-H | F-C-L | S-R-L |
| F-L-L | S-R-L | S-L-H | S-L-H | S-R-L | S-L-L | F-C-L | S-L-H |
| S-C-H | F-L-H | S-R-H | S-R-H | F-R-L | S-R-L | F-L-L | F-L-H |
| F-R-L | F-R-L | S-L-L | F-C-H | F-L-H | F-L-H | S-C-H | F-L-L |
| F-R-H | S-L-L | F-C-H | S-C-H | F-L-L | S-C-L | S-L-L | S-C-H |
| S-R-L | S-R-L | S-C-H | F-R-L | S-C-H | F-L-H | S-C-H | S-L-L |
| F-C-L | S-C-H | S-R-L | S-R-H | S-L-H | S-R-H | S-R-H | F-R-L |
| S-C-H | S-L-L | F-R-H | S-C-L | F-R-L | F-C-H | S-L-H | S-L-L |
| S-L-L | S-R-H | F-L-H | S-C-L | S-C-L | F-R-H | F-C-H | F-R-L |
| S-L-L | F-R-L | S-C-H | S-C-L | F-R-H | F-L-H | S-R-L | F-L-H |
| F-C-H | F-C-L | F-R-H | F-L-H | F-C-L | S-L-L | F-C-H | S-R-L |
| S-L-H | F-C-L | S-R-H | F-L-L | F-C-H | S-C-L | F-L-L | F-R-L |
| F-C-L | S-R-L | S-C-L | F-R-H | S-C-H | F-C-L | S-L-H | F-R-H |
| F-L-L | F-C-H | F-L-L | F-R-L | S-L-L | S-L-H | F-C-H | S-C-L |
| F-C-H | F-L-L | F-C-H | F-C-H | F-R-L | S-C-L | S-L-H | S-L-L |
| F-L-L | F-C-L | S-L-H | F-C-L | F-C-L | F-R-L | S-R-H | S-L-H |
| S-R-L | S-L-H | F-R-L | S-C-L | S-R-L | S-C-H | S-R-L | S-L-H |
| F-L-L | S-R-H | F-C-L | S-C-H | F-C-L | S-R-L | S-C-H | F-R-H |

## ORDER OF PRESENTATION OF EXPERIMENTAL CONDITIONS (CONT'D)

| Subject 1312 | | Subject 1412 | | Subject 1512 | | Subject 1612 | |
|---|---|---|---|---|---|---|---|
| S-L-H | S-C-L | S-C-L | S-R-L | F-L-L | F-C-L | S-R-H | S-L-L |
| S-C-L | F-C-L | S-L-L | F-L-L | S-R-H | F-C-L | S-L-H | F-C-H |
| F-C-L | F-L-H | S-L-L | F-R-L | S-L-H | F-L-L | S-C-L | F-L-L |
| F-L-H | F-R-H | F-R-H | S-R-H | F-C-H | F-C-L | F-C-L | F-R-H |
| F-R-L | S-C-L | F-L-H | S-R-L | S-C-L | F-C-H | F-L-H | S-R-L |
| F-C-H | S-R-L | F-L-L | F-C-L | F-R-H | F-C-H | S-L-L | S-C-H |
| F-R-H | S-L-L | S-R-L | F-L-H | S-C-H | F-L-H | F-L-L | F-C-H |
| S-R-L | S-C-H | S-L-H | S-R-H | F-L-L | S-L-H | F-C-L | F-C-H |
| S-R-H | F-C-H | F-R-L | F-L-H | F-L-H | S-R-L | S-R-L | S-R-H |
| S-R-H | F-L-L | F-C-H | F-L-L | S-C-L | F-R-L | S-C-H | S-R-L |
| S-C-H | S-C-H | S-C-H | S-R-L | S-L-H | F-C-H | F-R-H | F-C-H |
| F-L-H | S-R-H | S-L-L | F-C-L | S-R-L | S-C-H | F-R-L | S-R-H |
| S-L-L | F-R-H | S-L-H | F-L-L | S-R-H | F-R-L | F-R-H | F-L-H |
| F-C-H | F-L-L | S-R-L | F-C-L | S-L-L | S-L-H | S-L-L | F-L-H |
| F-L-H | S-R-H | S-C-H | S-R-H | S-C-H | F-L-L | F-L-L | F-L-L |
| F-R-L | F-R-H | F-C-H | F-C-L | F-L-H | S-R-H | F-C-L | S-C-H |
| S-L-H | F-C-L | S-L-L | S-C-H | F-R-H | F-L-L | S-R-H | F-L-L |
| S-C-L | S-C-L | S-C-L | F-L-H | S-C-H | S-R-H | F-L-H | F-C-H |

| Subject 1712 | | Subject 1812 | | Subject 1921 | | Subject 2021 | |
|---|---|---|---|---|---|---|---|
| S-L-L | F-C-L | F-C-L | S-L-H | F-R-L | F-C-H | S-R-L | S-L-L |
| F-L-L | F-R-L | S-C-L | F-R-H | S-L-L | F-R-H | F-R-L | S-L-L |
| F-C-H | F-C-H | F-C-L | F-R-L | S-C-L | F-R-L | S-C-H | S-C-H |
| S-L-L | S-L-H | S-R-L | F-R-L | F-R-L | S-C-L | F-L-L | F-C-H |
| F-R-L | S-L-H | F-C-H | F-C-L | F-R-H | S-L-H | F-R-H | F-R-L |
| F-L-H | F-L-L | S-C-H | F-R-L | F-C-L | S-R-L | S-L-H | F-C-L |
| F-R-L | F-R-L | S-L-H | F-R-L | F-C-H | S-C-L | S-R-L | S-C-H |
| S-R-H | F-C-L | F-C-H | S-L-L | S-L-L | S-C-H | S-R-H | S-R-H |
| S-C-L | S-R-H | S-R-H | F-C-H | S-L-H | S-L-H | F-C-L | F-L-H |
| F-R-H | S-L-L | S-L-L | S-C-L | F-C-H | S-C-L | F-L-L | F-R-H |
| F-C-L | S-R-H | F-L-L | S-L-H | F-L-H | F-C-H | S-C-L | F-R-H |
| F-R-L | S-C-L | S-R-H | S-C-L | F-R-L | F-R-L | F-L-H | S-L-H |
| S-L-H | S-L-L | F-L-L | S-C-L | S-C-L | S-C-L | F-C-H | F-L-L |
| F-L-H | F-L-H | F-C-L | F-C-L | S-R-H | F-R-H | S-L-H | F-L-L |
| F-L-L | F-R-L | F-R-L | F-C-H | F-R-H | F-C-H | S-R-H | F-R-L |
| F-R-H | F-R-L | S-L-H | F-R-H | S-C-H | S-C-H | F-L-L | S-C-H |
| F-C-L | S-C-H | F-R-H | F-C-L | S-R-L | S-R-H | S-L-L | F-C-L |
| S-C-L | F-R-H | S-C-L | F-R-H | S-C-H | S-C-H | F-C-H | F-C-L |
| S-C-H | F-L-L | F-C-H | F-R-H | F-L-H | S-R-H | F-R-L | F-R-H |
| S-R-L | S-R-L | S-R-L | S-R-L | F-C-L | S-R-L | F-C-L | F-L-H |
| S-C-H | S-R-L | F-L-H | F-L-L | F-L-L | S-L-H | S-L-L | S-C-L |
| F-L-L | F-L-H | S-C-H | S-L-L | S-R-L | F-R-L | S-C-H | F-L-L |
| F-C-L | S-L-L | S-C-H | F-L-H | F-R-H | F-L-H | F-C-H | S-C-H |
| S-R-H | S-C-L | S-L-L | S-R-L | S-L-H | F-R-H | F-C-L | S-L-L |
| S-R-L | S-L-H | F-R-L | S-C-H | F-L-L | F-C-H | S-R-L | S-C-L |

## ORDER OF PRESENTATION OF EXPERIMENTAL CONDITIONS (CONT'D)

### Subject 1712

F-R-H
F-R-L
S-L-H
S-C-L
F-L-H
F-L-L
S-L-L
F-C-L
S-C-L
S-R-H
S-L-H
S-R-L
S-C-H
F-C-H
S-L-L
F-C-H
S-R-L
F-C-L
F-R-H
F-R-H
F-C-L
F-L-H
S-L-H
S-L-H
S-C-H
S-C-H
S-C-H
S-R-H
F-R-H
F-C-H
F-R-H
F-C-H
F-L-L
F-C-H
S-R-H
S-R-H
S-C-H
F-L-L
S-C-L
F-L-H
S-R-L
S-L-L
S-R-L
S-C-L
F-L-H
F-C-H

### Subject 1812

S-C-L
F-R-L
S-C-H
S-R-L
S-C-L
S-L-L
F-R-H
F-R-H
F-R-L
F-L-L
F-C-L
F-L-L
S-L-H
F-R-H
F-C-H
F-L-H
F-L-H
F-L-H
S-R-H
F-L-H
S-L-L
S-C-L
S-L-H
S-C-H
F-L-L
F-C-L
F-C-H
S-C-H
S-L-L
F-C-H
S-C-H
S-L-L
S-R-L
F-L-H
F-L-H
S-R-L
S-R-H
S-L-L
S-R-L
S-R-H
S-L-H
S-L-H
F-L-L
F-L-L
S-R-H
S-R-H

### Subject 1921

F-L-L
S-R-L
S-C-H
F-C-H
S-R-H
S-C-L
S-R-H
F-R-H
F-C-L
S-R-L
S-L-H
F-R-L
F-C-L
F-L-H
S-L-L
F-C-H
S-R-H
F-L-L
F-L-H
S-C-H
F-R-L
S-C-H
S-L-H
S-L-L
S-L-L
F-L-L
F-C-L
F-L-L
F-R-H
F-C-L
F-C-L
F-L-H
F-L-H
F-L-L
F-C-L
S-R-H
S-L-H
S-L-L
S-L-L
S-R-L
S-L-L
S-R-H
S-R-L
F-L-L
F-L-H
S-C-L

### Subject 2021

F-L-H
F-R-L
S-C-L
S-L-L
S-C-H
F-C-L
F-R-L
F-L-H
S-R-L
S-L-H
F-R-H
S-C-L
S-R-H
F-L-H
F-L-L
F-R-H
S-C-L
S-C-H
S-L-L
F-C-L
S-L-H
F-R-H
F-L-L
S-L-L
F-C-H
S-R-H
F-L-H
S-R-H
S-C-L
S-L-H
F-R-L
S-C-L
F-R-L
S-L-H
F-L-H
S-L-H
S-R-H
F-C-H
F-C-H
S-R-L
S-R-L
S-R-L
S-R-L
F-C-H
S-R-H
F-R-H

### Subject 2121

F-L-L
F-C-H
S-C-L
F-L-L
F-C-H
S-R-L
S-R-L
F-R-H
S-R-L
S-L-H
S-L-H
S-L-L
S-C-L
S-C-H
F-C-L
F-C-L
S-R-H
S-R-H
F-L-H
F-R-L
F-L-L
S-L-H
F-R-L
S-R-L
F-L-H
F-R-L
S-C-L
S-L-L
S-L-H
F-C-L
S-C-H
S-L-L
S-L-L
F-C-H
S-C-H
S-L-H
F-L-H
F-R-L
F-C-L
F-C-H

### Subject 2221

F-R-L
S-R-L
F-L-H
F-R-H
F-L-L
S-C-L
F-C-L
F-R-L
F-R-H
S-R-H
S-L-L
S-C-H
S-R-L
S-C-H
F-L-H
S-L-H
F-C-H
S-C-L
S-L-L
S-C-H
F-L-H
S-R-H
S-L-L
F-R-H
S-L-H
S-C-L
S-R-H
F-R-L
F-R-L
S-L-H
F-C-H
F-C-L
S-L-H
F-C-L
F-R-L
S-L-L
S-L-L
F-R-L
S-C-H
S-L-L

### Subject 2321

F-C-L
S-L-H
S-R-H
S-C-L
F-R-L
F-C-H
S-R-L
S-L-H
F-C-L
F-L-L
S-R-H
F-L-L
F-L-H
S-L-H
S-C-H
S-R-H
S-R-L
S-L-L
F-R-H
F-C-H
F-R-L
S-C-H
F-R-L
S-R-L
S-L-L
F-L-H
S-C-L
F-C-H
S-C-L
S-L-H
F-C-L
F-C-L
S-R-L
F-C-H
F-R-H
S-C-H
F-C-H
S-L-H
S-L-H
S-L-L

### Subject 2421

F-R-L
S-R-L
F-R-H
S-C-L
F-R-L
S-C-H
S-R-H
F-R-H
F-C-L
S-L-L
F-L-H
F-L-H
S-C-L
S-L-H
F-L-L
S-C-H
S-L-L
F-C-H
S-R-H
S-R-L
F-C-H
F-R-H
S-C-H
F-C-L
F-C-H
S-C-L
S-R-L
F-C-H
S-C-L
S-L-L
S-C-H
F-R-H
F-R-L
S-C-H
F-R-H
F-C-L
S-C-L
S-R-L
F-R-H
F-L-L

## ORDER OF PRESENTATION OF EXPERIMENTAL CONDITIONS (CONT'D)

**Subject 2121**

F-R-L S-C-L
S-C-H F-R-L
S-C-L F-L-L
S-C-H S-C-L
S-R-L S-R-H
F-L-H F-L-L
S-R-H F-C-L
F-R-L S-L-H
S-L-H F-C-L
S-L-L F-C-L
F-C-L S-C-H
S-L-L F-L-H
S-C-L S-R-L
F-C-H F-R-H
F-R-H F-L-H
F-L-L S-C-L
F-L-H F-L-H
S-L-H S-R-L
F-R-H S-R-L
S-R-H F-L-L
F-L-L S-R-H
F-L-H S-R-H
F-C-H F-R-H
F-R-H F-R-H
S-L-L S-C-H
F-C-H S-C-H
S-R-H F-C-H
S-L-L F-L-L

**Subject 2221**

S-L-L F-R-H
F-R-L F-L-L
F-C-H F-L-L
F-C-L F-L-H
F-C-L F-R-H
F-C-H S-C-L
F-R-L S-R-H
F-L-H S-C-L
F-R-H S-C-H
S-C-L F-R-H
S-R-H F-C-L
S-C-L S-L-H
F-L-L S-C-L
S-R-H S-R-H
S-L-H F-L-L
S-R-L S-C-H
S-L-H F-C-L
F-L-L S-R-L
S-R-L F-C-L
F-L-L F-C-H
S-L-H S-R-L
F-R-H F-L-H
F-C-H F-L-H
F-C-H S-R-L
S-C-H F-L-H
F-L-L S-R-L
S-L-L S-R-H
F-C-H S-C-H

**Subject 2321**

F-L-L F-C-H
F-L-H F-L-H
F-R-L F-R-H
F-L-H F-C-L
S-L-L F-L-H
F-R-H S-L-L
F-C-L F-R-H
F-L-L S-L-L
S-C-H S-C-L
S-C-L F-C-L
S-R-H S-R-H
S-L-H S-C-L
S-C-L F-L-H
F-L-H S-R-L
F-R-H S-C-H
F-R-L F-R-L
S-C-H S-R-H
F-C-H S-R-H
F-R-L F-R-H
S-L-L S-R-H
S-R-L F-R-L
S-C-H F-L-L
F-C-H S-L-H
S-C-H S-L-L
S-R-L F-L-L
F-C-L S-C-L
S-R-L F-L-L
F-L-L F-R-H

**Subject 2421**

S-R-L F-C-H
S-R-L F-R-L
S-C-H F-C-L
F-C-H F-C-H
S-C-H F-L-L
S-R-H F-R-L
F-C-L F-R-L
F-L-L F-L-H
F-L-L S-L-L
F-R-H F-L-H
S-L-H S-R-L
F-C-L S-R-H
S-L-H S-R-L
S-R-H S-L-L
F-R-L S-R-H
F-L-H F-L-L
F-R-L S-L-H
S-L-H F-L-L
F-C-H S-R-H
S-L-L S-L-H
S-C-L F-C-L
F-L-H F-C-L
S-C-H S-L-H
S-L-L S-L-H
S-C-L F-L-H
F-R-H S-R-H
F-L-L F-L-H
S-C-L S-L-L

**Subject 2521**

F-C-H F-C-H
F-L-L F-L-L
F-R-L S-C-L
S-L-H S-R-L
S-C-L F-L-H
S-R-H S-R-H
F-C-L S-C-H
S-R-L S-C-H
F-R-H S-L-H
F-R-L F-L-H
S-L-L F-C-H
S-L-H S-L-H
F-R-H F-L-L
F-C-L F-R-H
F-L-H F-L-H
S-R-H S-C-L
F-L-L F-C-L

**Subject 2621**

S-L-L F-R-H
S-C-H F-L-L
S-R-L F-L-H
F-L-H F-C-H
F-R-H F-R-H
F-L-H F-R-L
F-R-L S-C-H
S-C-L S-R-H
F-R-H F-R-L
S-C-L F-C-H
S-L-H F-R-H
S-C-H S-L-L
S-R-L F-R-L
S-R-H F-C-L
S-L-L F-L-H
F-L-L F-L-L
F-R-H F-R-H

**Subject 2721**

F-L-L F-L-H
F-L-L S-L-L
F-C-L S-C-L
S-L-H S-L-H
F-R-H S-C-H
F-R-L F-L-L
F-L-L S-L-L
F-R-L S-C-L
S-C-L S-L-L
F-C-H S-L-H
S-L-H F-L-L
S-L-L S-C-H
S-C-H F-C-L
F-C-L S-C-H
S-R-H S-L-H
S-R-L S-R-L
S-L-H S-L-H

**Subject 2822**

F-R-L F-C-L
F-R-L F-C-L
F-L-H S-R-L
S-C-H F-C-L
F-R-H S-L-H
S-R-H S-L-H
F-L-L S-L-L
S-C-L S-C-L
S-C-L F-L-H
F-C-L F-R-L
F-R-L S-C-H
S-L-L F-C-H
S-L-H F-R-L
F-C-H S-C-H
S-C-L S-C-H
F-R-H F-C-L
F-L-H S-R-L

## ORDER OF PRESENTATION OF EXPERIMENTAL CONDITIONS (CONT'D)

| Subject 2521 | | Subject 2621 | | Subject 2721 | | Subject 2822 | |
|---|---|---|---|---|---|---|---|
| F-C-H | F-C-L | F-C-H | S-C-H | F-C-H | S-R-L | S-R-L | F-C-H |
| S-C-H | S-C-L | F-R-L | S-C-H | F-L-H | F-L-H | S-L-L | S-L-H |
| S-R-L | F-L-L | F-C-L | S-L-H | S-R-H | S-C-H | S-C-H | S-C-L |
| S-C-H | S-C-L | F-C-H | F-C-H | S-C-H | S-R-H | S-R-H | S-L-L |
| F-R-L | F-L-H | S-R-H | S-C-L | S-R-L | S-R-H | F-C-L | S-L-L |
| S-R-L | S-C-H | S-L-L | S-C-H | F-C-L | F-L-H | S-R-L | S-R-L |
| S-R-L | F-R-L | F-C-H | F-C-L | F-L-L | F-R-L | F-C-L | S-R-H |
| F-C-L | S-L-H | F-L-L | F-C-L | F-C-L | F-R-L | S-L-H | F-L-H |
| S-C-L | F-C-H | S-L-H | S-L-L | F-R-H | S-R-L | S-R-H | S-C-L |
| F-L-H | S-L-H | S-L-L | S-R-L | S-R-H | F-R-H | F-L-L | S-C-H |
| S-C-H | F-L-L | F-C-L | S-L-L | F-R-L | F-C-L | F-R-H | S-L-L |
| S-R-H | F-R-L | F-L-L | S-L-H | S-R-L | S-C-L | S-C-H | F-R-L |
| S-L-H | S-R-L | F-R-H | S-R-L | S-L-H | S-R-L | S-C-L | S-L-H |
| S-L-H | F-C-H | S-R-H | S-C-H | F-R-H | F-R-H | F-R-L | S-R-H |
| S-R-H | F-C-L | F-C-L | F-C-L | F-C-H | F-R-L | F-L-H | F-R-L |
| F-L-H | S-R-H | S-L-H | S-L-H | S-C-H | F-L-H | F-L-L | F-R-H |
| F-R-H | F-C-L | S-C-L | S-R-H | F-R-L | F-L-L | S-L-H | F-R-H |
| S-L-L | F-R-L | F-C-L | S-L-L | S-L-L | F-L-L | S-L-H | F-L-L |
| F-R-L | S-R-L | S-C-L | S-R-L | S-C-L | F-C-H | S-C-H | F-R-H |
| S-C-L | S-L-L | S-R-L | S-L-H | F-R-H | F-C-H | F-C-H | F-C-H |
| F-C-H | S-R-L | S-R-L | S-C-L | F-L-H | S-C-L | S-R-L | F-L-L |
| F-C-L | S-L-L | S-C-H | F-L-H | S-L-L | F-C-L | S-R-H | F-C-H |
| F-L-L | S-R-H | F-L-H | S-R-H | F-L-H | S-R-H | S-L-L | S-R-L |
| S-L-L | F-C-H | F-R-L | F-L-L | S-C-H | S-R-H | F-C-H | F-C-H |
| F-R-H | S-R-H | F-L-L | F-L-H | S-C-L | F-C-H | F-C-L | S-R-H |
| F-R-H | F-R-L | F-L-H | S-R-L | F-L-H | F-C-L | F-R-H | S-R-H |
| S-C-L | F-L-H | S-C-L | S-C-L | F-R-L | S-R-H | F-L-H | F-L-H |
| S-C-H | S-L-L | F-R-L | S-R-H | F-R-H | F-C-H | S-R-L | F-L-L |
| F-R-H | S-L-L | F-C-H | S-R-H | F-R-H | S-L-L | F-R-H | F-L-L |
| S-C-L | F-L-L | S-L-H | F-L-L | S-R-L | F-C-H | S-C-L | F-L-H |
| F-R-H | S-L-L | F-C-H | F-R-L | S-C-L | S-L-L | S-L-L | F-L-L |

| Subject 2922 | | Subject 3022 | | Subject 3122 | | Subject 3222 | |
|---|---|---|---|---|---|---|---|
| S-L-H | S-R-H | F-C-H | S-R-H | F-C-L | S-C-H | S-R-H | S-C-H |
| S-L-L | S-R-L | S-R-L | F-R-H | S-R-H | F-C-L | F-R-L | F-R-L |
| S-R-L | F-C-L | F-C-L | F-C-L | S-R-H | S-R-L | S-L-H | S-L-L |
| S-C-H | F-R-H | F-L-L | S-C-H | F-R-L | S-C-H | S-L-H | S-L-L |
| S-C-L | S-R-H | S-R-L | F-C-H | F-C-L | S-C-L | F-L-L | F-R-H |
| F-C-H | S-L-H | S-L-H | S-L-H | S-L-H | F-C-H | S-R-L | F-C-L |
| S-L-L | F-C-L | F-R-L | S-L-H | F-L-L | S-C-H | F-C-L | F-R-L |
| F-C-H | S-R-L | S-L-L | S-C-H | S-R-H | F-C-H | S-R-H | S-L-H |
| S-R-L | S-L-H | F-L-L | F-R-L | S-R-H | S-C-H | F-C-H | S-R-L |
| S-L-H | F-R-L | S-C-H | F-L-L | F-C-L | F-R-L | F-C-H | S-L-L |
| F-C-L | S-L-H | S-C-L | F-R-H | F-L-H | F-C-H | F-C-L | S-L-L |
| F-L-L | S-C-H | S-R-H | F-C-H | S-R-L | S-R-L | F-L-L | S-L-H |

## ORDER OF PRESENTATION OF EXPERIMENTAL CONDITIONS (CONT'D)

| Subject 2922 | | Subject 3022 | | Subject 3122 | | Subject 3222 | |
|---|---|---|---|---|---|---|---|
| S-R-L | S-L-L | S-L-L | S-L-L | S-C-H | S-R-H | S-R-L | F-C-L |
| F-R-L | F-R-L | S-L-H | F-C-H | S-L-H | S-L-H | F-L-H | S-R-H |
| F-L-H | F-R-L | F-R-L | F-R-H | F-R-L | S-L-L | F-L-L | F-C-H |
| F-R-H | S-R-H | F-R-H | F-R-L | F-L-L | F-C-L | S-C-L | F-R-L |
| S-R-H | S-L-L | F-C-H | F-L-H | F-C-H | S-L-L | S-C-H | S-C-H |
| F-C-H | S-L-H | F-C-L | F-L-H | F-R-H | F-C-L | F-R-L | F-L-H |
| F-C-L | F-L-H | F-L-L | S-L-L | S-L-H | F-C-L | F-R-H | S-R-H |
| F-L-H | S-L-H | S-R-L | S-L-H | S-L-L | F-L-H | S-L-L | S-C-H |
| S-R-H | F-R-H | F-L-H | F-R-L | S-C-L | F-L-H | S-C-H | F-C-L |
| F-L-L | F-L-L | S-R-H | S-L-H | S-C-H | S-R-L | S-L-L | F-C-L |
| F-C-L | S-L-L | S-L-L | S-R-H | F-C-L | F-L-L | F-L-H | F-C-L |
| S-C-L | S-C-L | S-C-L | S-L-L | F-L-H | S-R-H | S-C-H | F-R-L |
| F-C-H | F-C-H | S-C-L | S-C-L | F-L-L | S-L-H | S-C-L | F-L-L |
| F-R-H | S-C-H | S-L-H | S-C-L | S-L-L | S-L-L | F-L-H | S-L-H |
| S-L-H | S-C-H | F-R-L | F-L-L | S-C-L | S-C-L | S-L-L | F-L-H |
| S-L-L | F-L-H | F-R-H | F-C-H | F-R-L | F-R-L | S-R-H | F-R-H |
| S-R-H | S-C-H | F-L-L | F-R-H | S-C-H | S-L-H | F-R-L | F-L-H |
| F-R-L | F-R-L | F-L-H | S-C-L | S-C-L | F-R-L | F-R-L | S-L-H |
| F-C-L | S-L-L | F-C-L | S-C-H | S-L-L | S-C-L | F-C-L | F-L-L |
| S-C-L | F-L-L | S-C-L | S-C-L | F-R-H | F-L-H | F-C-L | S-R-H |
| F-L-H | F-L-L | S-C-H | S-C-H | F-C-H | F-R-H | S-C-H | F-C-H |
| S-C-L | F-C-H | F-C-L | S-R-H | S-L-H | S-C-L | S-L-H | F-L-L |
| S-R-L | F-R-H | S-R-L | F-C-L | S-C-H | F-R-L | S-R-L | S-C-L |
| F-L-H | F-R-H | F-R-H | F-L-L | F-R-L | F-L-L | F-R-H | F-C-H |
| S-C-H | S-R-H | F-R-L | S-R-L | F-R-H | S-R-L | S-R-H | S-R-L |
| S-C-H | S-R-H | F-C-H | S-R-H | F-L-L | F-R-H | F-C-H | F-C-H |
| F-R-L | S-C-L | S-C-H | F-L-L | F-L-H | S-C-L | F-R-H | S-R-H |
| S-L-L | F-C-L | F-C-H | F-C-L | S-R-L | F-R-H | S-C-L | F-L-L |
| F-L-L | F-L-L | S-L-L | F-C-L | S-R-H | F-L-H | S-L-H | S-C-L |
| F-R-H | F-L-L | S-R-H | F-L-H | F-C-L | S-R-L | F-L-L | F-L-H |
| F-R-H | S-C-L | F-L-H | S-R-L | F-C-H | F-L-H | F-R-H | S-R-L |
| F-C-H | F-C-H | S-R-H | F-L-H | F-R-H | S-R-H | S-R-L | S-C-L |
| S-C-H | S-R-L | S-L-H | S-R-L | S-L-L | F-L-L | F-R-H | S-C-L |
| S-C-L | S-R-L | F-R-L | F-L-H | S-L-H | S-L-L | F-R-H | F-L-H |
| F-R-L | F-L-H | S-L-L | S-C-H | F-C-H | S-R-H | S-C-H | F-C-H |
| F-C-L | F-L-H | S-R-L | F-R-H | F-R-H | F-L-L | S-R-L | S-L-L |

| Subject 3322 | | Subject 3422 | | Subject 3522 | | Subject 3622 | |
|---|---|---|---|---|---|---|---|
| S-L-L | F-R-L | S-R-L | F-L-H | F-L-L | F-R-L | F-C-L | F-R-H |
| F-L-H | F-C-L | F-C-H | F-R-H | S-C-L | S-R-H | S-R-L | S-C-L |
| F-R-H | S-C-H | F-C-L | F-C-H | F-R-H | F-L-L | S-R-L | S-R-H |
| F-R-L | S-L-H | S-R-H | S-L-L | F-L-L | S-R-L | S-L-H | S-L-L |
| F-R-H | F-L-L | S-R-L | S-R-H | F-L-H | S-L-L | F-C-H | F-L-L |
| S-C-L | S-C-L | S-C-H | S-C-H | F-R-H | F-C-L | S-L-L | S-R-L |
| S-L-L | F-R-H | S-C-H | S-R-H | F-R-L | F-L-H | F-R-L | S-R-H |

## ORDER OF PRESENTATION OF EXPERIMENTAL CONDITIONS (CONT'D)

| Subject 3322 | | Subject 3422 | | Subject 3522 | | Subject 3622 | |
|---|---|---|---|---|---|---|---|
| F-R-L | F-L-L | F-L-L | S-C-H | S-L-L | S-C-H | S-C-L | S-C-L |
| S-C-L | F-C-H | F-L-H | S-C-H | S-C-H | S-L-H | F-L-L | S-C-L |
| F-R-H | S-L-H | F-L-H | S-R-L | F-R-L | F-C-H | S-C-H | S-C-H |
| S-L-H | F-L-L | F-R-L | F-R-H | S-R-L | F-C-H | F-R-H | S-C-L |
| F-C-L | F-L-H | S-L-L | F-C-H | S-C-H | S-C-L | F-L-L | S-L-H |
| F-L-L | S-C-L | F-R-L | S-C-L | F-C-L | F-L-L | F-C-L | F-C-L |
| F-L-H | S-C-L | S-L-H | S-L-H | F-C-L | S-L-H | S-C-L | F-L-L |
| S-R-H | F-L-L | F-R-H | S-C-H | F-R-L | S-L-H | S-L-H | F-R-H |
| S-C-H | S-R-H | S-L-L | F-L-L | F-C-H | S-R-H | S-L-L | F-C-H |
| S-C-H | F-L-H | S-C-L | S-C-H | S-R-H | S-R-L | F-C-H | F-R-H |
| S-R-L | F-R-L | S-L-L | S-C-L | S-L-L | F-R-H | S-R-L | S-C-H |
| F-C-H | S-L-L | S-C-L | F-R-L | S-R-H | S-L-L | S-R-H | F-R-H |
| S-L-L | F-R-L | F-R-H | S-L-L | S-L-H | F-R-L | F-L-H | F-R-L |
| F-C-H | S-L-H | F-R-L | S-R-H | F-L-H | F-C-L | S-R-L | S-R-H |
| S-R-L | F-R-L | S-L-L | F-L-H | S-C-L | S-C-H | F-L-L | S-C-H |
| F-L-L | F-C-H | S-C-L | S-R-L | S-C-H | S-R-L | S-C-L | F-L-H |
| S-L-H | S-L-H | S-C-L | F-L-L | S-L-H | S-C-H | F-R-H | F-C-H |
| F-C-H | S-R-H | F-L-H | F-L-H | S-L-L | F-C-L | F-R-L | S-L-L |
| S-L-H | S-R-H | F-C-L | S-R-H | S-C-L | F-C-L | S-L-L | S-L-L |
| S-R-L | F-C-H | S-L-H | F-R-L | F-L-H | F-R-L | F-C-H | S-L-H |
| S-C-H | F-L-H | F-C-L | S-C-L | F-R-L | F-C-H | F-L-L | F-C-H |
| F-C-L | S-C-H | F-C-H | S-R-L | F-C-H | S-L-L | F-L-H | F-R-L |
| F-C-H | F-R-H | S-L-H | F-L-H | F-C-H | S-C-L | S-L-H | F-R-L |
| F-C-L | S-R-L | S-C-H | S-L-L | F-C-L | S-C-L | S-C-H | S-R-H |
| S-L-L | F-C-H | F-R-H | F-R-L | F-R-H | S-L-L | S-R-H | F-L-H |
| S-C-L | F-L-L | F-C-L | F-R-H | S-C-H | S-C-H | F-C-L | S-L-H |
| S-R-L | S-L-L | F-L-L | F-C-L | S-R-L | F-C-H | F-R-L | F-C-H |
| S-R-H | F-C-L | S-R-H | S-L-L | F-L-L | F-R-H | F-R-H | S-L-L |
| F-R-L | S-C-H | F-L-L | F-C-H | S-R-H | F-R-H | S-L-L | F-L-H |
| F-L-L | F-R-H | S-R-H | F-C-L | S-R-H | F-L-H | F-L-H | S-R-L |
| F-R-H | F-C-L | F-L-L | S-L-H | F-C-L | S-C-L | F-C-L | F-L-L |
| S-R-H | F-R-H | S-R-L | F-C-L | S-L-H | F-R-H | S-C-L | S-R-L |
| F-L-H | F-C-L | F-R-L | F-L-H | F-L-L | F-L-H | F-R-L | F-C-L |
| S-C-L | S-R-H | S-R-L | F-L-L | S-L-H | S-R-L | S-R-L | S-R-H |
| F-L-H | S-R-L | F-C-H | S-R-H | S-R-L | S-R-H | S-C-H | F-C-L |
| S-L-H | S-R-L | S-L-H | S-L-H | F-R-H | F-L-L | S-L-H | F-C-H |
| S-C-H | F-L-H | F-R-L | F-C-L | S-L-H | F-L-L | S-C-H | F-L-L |
| S-L-L | S-R-L | F-C-H | F-L-L | S-L-L | S-R-L | F-C-L | S-R-L |
| F-R-L | S-C-H | S-C-L | F-R-H | F-C-H | F-L-H | S-L-H | F-L-H |
| S-C-L | S-R-H | S-L-H | F-R-H | S-R-H | S-C-L | S-C-H | F-L-H |
| S-L-L | F-C-L | S-R-L | F-C-H | F-R-L | F-L-H | F-R-L | F-R-H |

| Subject 3731 | | Subject 3831 | | Subject 3931 | | Subject 4031 | |
|---|---|---|---|---|---|---|---|
| S-L-L | F-R-L | S-L-L | F-R-L | S-L-L | S-R-H | S-L-L | F-R-L |
| F-L-L | S-L-H | S-R-L | S-R-L | F-R-L | F-R-H | S-L-H | F-L-L |

## ORDER OF PRESENTATION OF EXPERIMENTAL CONDITIONS (CONT'D)

| Subject 3731 | | Subject 3831 | | Subject 3931 | | Subject 4031 | |
|---|---|---|---|---|---|---|---|
| F-R-L | F-L-L | F-C-L | F-C-H | F-L-L | S-L-L | F-L-L | S-R-L |
| F-C-L | S-R-L | F-L-L | S-L-H | F-C-H | S-C-L | F-C-L | S-L-H |
| S-R-L | S-R-H | S-C-H | F-L-L | F-L-L | S-C-L | F-R-H | F-C-L |
| S-C-H | F-L-L | F-C-H | S-L-H | S-R-L | F-R-L | F-R-L | S-R-H |
| F-C-H | S-C-L | F-R-L | F-C-L | F-C-H | F-C-L | S-C-L | S-L-L |
| S-R-H | F-C-L | F-L-L | S-R-L | S-R-L | F-C-H | F-C-L | S-L-H |
| S-C-H | F-R-L | S-L-L | S-L-H | F-L-L | S-L-L | S-R-H | F-L-L |
| F-L-H | S-R-H | F-C-H | S-R-H | F-R-H | F-L-H | F-C-L | F-L-L |
| F-R-H | F-L-H | S-R-L | S-C-L | S-R-L | S-L-H | F-C-H | S-R-H |
| F-R-L | F-R-H | S-R-L | F-L-L | S-L-H | S-R-L | S-L-L | S-R-L |
| F-L-L | S-L-H | F-R-L | F-L-L | F-C-L | F-L-H | F-C-H | F-L-H |
| S-R-H | F-C-L | S-L-H | S-R-L | S-L-H | F-C-H | F-R-H | F-C-L |
| S-R-L | S-C-H | S-C-L | F-C-L | S-L-L | F-R-L | S-R-L | F-R-H |
| F-R-H | S-L-H | F-R-H | S-C-H | S-C-L | S-C-L | F-L-L | F-C-H |
| S-L-H | S-C-H | S-R-H | S-R-H | S-C-H | S-R-H | F-L-H | S-C-L |
| S-L-H | S-C-L | F-L-H | F-R-H | F-C-L | F-R-H | S-R-H | S-C-H |
| F-C-L | F-L-L | S-C-L | F-C-L | S-C-L | S-C-H | F-L-H | F-C-H |
| S-L-H | S-R-H | F-C-L | F-R-L | F-C-L | F-R-L | F-L-L | S-L-L |
| F-L-L | F-C-H | S-L-H | F-L-H | S-R-H | S-R-L | S-L-H | F-C-L |
| S-C-L | S-R-L | F-L-L | F-C-H | F-R-H | S-C-H | S-C-H | F-R-L |
| F-C-H | F-C-L | S-R-H | S-L-L | S-R-H | S-L-L | S-C-H | F-R-L |
| S-L-H | S-L-L | S-R-H | S-L-L | F-L-H | F-L-H | S-R-L | S-C-H |
| S-R-L | F-C-H | S-C-H | S-L-L | F-L-H | F-L-L | F-R-H | F-R-H |
| S-C-H | F-R-H | F-L-H | F-R-H | F-R-L | F-L-L | F-L-L | S-C-H |
| S-C-L | F-L-H | S-R-H | F-R-H | F-R-L | F-R-H | S-R-L | F-L-H |
| S-L-H | S-L-L | S-L-H | S-L-L | F-C-H | F-C-L | S-L-L | S-C-H |
| F-C-L | F-L-H | F-R-H | F-R-H | S-C-H | S-L-H | S-C-L | F-C-H |
| S-R-L | F-R-L | S-R-L | S-C-H | S-C-L | F-L-L | F-R-L | F-R-L |
| F-R-H | F-C-H | S-C-H | F-L-L | S-C-H | S-R-L | F-L-H | S-L-H |
| F-L-L | S-L-L | F-L-L | S-C-L | S-R-L | S-C-H | S-C-L | F-R-H |
| F-R-L | S-L-L | S-C-L | F-C-H | S-R-H | F-C-H | F-R-L | S-C-L |
| F-R-H | S-C-L | F-C-H | F-R-L | F-L-H | S-R-H | F-C-L | F-C-H |
| F-L-H | F-C-L | F-L-H | S-C-H | F-R-L | S-L-H | S-C-H | F-R-H |
| F-C-H | F-R-H | S-L-H | F-L-H | S-L-L | S-C-L | F-C-H | F-R-L |
| S-C-L | F-L-L | F-L-H | F-R-L | S-L-H | F-R-H | S-R-H | F-C-L |
| S-R-H | S-L-H | S-C-H | F-C-H | F-C-L | F-C-L | F-R-H | S-R-L |
| S-C-L | S-C-H | F-R-L | F-C-L | S-L-L | S-R-L | F-L-H | S-R-H |
| F-L-H | S-C-L | S-L-L | F-L-H | S-C-H | S-L-H | S-L-H | S-R-L |
| F-C-L | F-R-H | F-C-H | F-L-H | S-C-L | F-R-L | F-R-L | S-L-L |
| F-R-L | F-R-L | S-L-L | S-R-H | F-C-H | F-C-L | S-L-H | F-L-L |
| S-C-H | S-R-L | F-R-H | S-C-L | F-R-H | S-C-H | S-C-L | S-R-H |
| S-L-L | S-R-H | F-C-L | S-C-H | F-L-H | F-L-H | F-C-H | S-C-L |
| F-C-H | S-C-H | F-R-L | S-L-H | S-L-H | S-L-L | S-R-L | S-L-L |
| S-L-L | F-L-H | S-C-L | S-R-L | F-R-H | F-C-H | S-L-L | S-L-H |
| F-L-H | F-C-H | F-C-L | S-C-L | S-R-H | S-R-H | S-C-H | F-C-H |
| S-R-H | S-R-L | F-R-H | S-R-H | F-L-L | F-L-L | S-R-H | S-C-L |

## ORDER OF PRESENTATION OF EXPERIMENTAL CONDITIONS (CONT'D)

| Subject 4131 | | Subject 4231 | | Subject 4331 | | Subject 4431 | |
|---|---|---|---|---|---|---|---|
| S-R-L | S-R-L | S-R-L | F-R-H | F-C-H | F-R-L | F-L-L | S-R-L |
| F-C-L | S-L-L | F-R-L | F-C-H | F-R-L | F-C-L | S-R-H | F-C-H |
| S-R-L | F-R-H | F-R-H | F-C-L | S-L-L | S-L-H | F-C-H | F-C-L |
| S-L-H | S-C-H | F-R-L | S-C-L | F-L-H | S-C-L | F-L-L | F-L-L |
| S-L-L | S-L-L | S-C-L | S-R-L | F-R-H | F-R-L | S-L-H | S-R-H |
| F-C-H | F-L-H | F-R-L | S-L-H | F-L-L | F-L-L | S-C-L | S-R-L |
| F-R-L | F-R-H | S-C-H | F-R-L | S-C-L | F-C-H | S-R-H | S-C-H |
| F-L-L | F-L-H | F-R-H | F-L-L | S-L-H | S-R-L | F-C-L | S-C-H |
| F-R-H | S-R-H | F-C-L | S-L-L | F-C-L | S-L-H | S-R-L | F-L-L |
| S-C-H | F-R-L | S-L-L | S-L-H | F-L-L | F-C-L | F-R-H | S-L-L |
| F-R-H | S-C-L | S-R-H | F-L-L | F-R-L | F-R-H | F-C-H | F-L-H |
| S-C-L | F-R-H | F-L-H | S-C-H | F-L-H | S-R-H | F-R-L | F-L-H |
| F-L-L | F-L-H | F-L-H | S-C-L | F-R-H | F-L-L | S-L-L | F-R-L |
| F-C-L | S-C-L | S-C-L | S-R-H | S-R-H | F-L-H | S-C-H | F-R-L |
| F-C-H | S-L-H | F-C-L | S-L-H | S-L-L | F-L-H | S-L-H | S-C-L |
| S-C-L | S-C-H | S-L-H | F-R-H | S-C-H | S-C-H | F-C-L | S-L-H |
| S-C-H | S-R-L | F-L-L | S-L-L | S-R-L | S-R-H | F-L-H | F-R-H |
| S-L-H | F-R-L | S-C-H | F-C-H | S-R-L | F-C-H | F-L-H | S-L-L |
| S-L-L | S-R-H | S-L-L | F-C-L | S-C-H | S-R-L | S-R-H | S-C-H |
| F-C-H | S-L-L | F-C-H | S-R-L | S-R-H | S-L-L | S-C-L | S-C-L |
| S-R-H | F-L-L | S-L-H | F-L-L | F-L-H | S-R-H | F-L-L | S-L-L |
| S-R-L | F-C-H | S-R-H | F-R-L | S-L-H | F-R-H | F-C-H | S-C-L |
| S-R-H | F-C-H | S-R-L | S-C-L | F-C-H | F-C-H | F-R-L | F-R-H |
| F-L-H | F-R-L | F-R-H | F-L-H | S-C-L | F-L-L | S-C-H | F-R-L |
| S-R-L | F-C-L | S-R-L | S-R-H | S-L-L | F-L-H | S-R-L | F-R-L |
| F-L-H | S-C-H | S-R-L | S-L-L | S-C-H | F-R-L | S-R-L | S-L-L |
| S-C-L | F-C-H | F-L-H | F-L-H | S-L-L | S-L-L | S-C-H | S-C-L |
| S-L-H | S-R-H | S-C-H | S-C-L | S-C-L | F-R-H | F-R-L | S-R-H |
| F-R-H | F-C-H | F-C-H | S-L-H | F-R-L | F-C-L | F-R-H | F-L-L |
| F-L-L | F-L-L | F-L-L | S-R-H | F-C-H | S-L-H | S-R-L | S-L-H |
| S-L-L | S-L-H | S-R-H | F-R-L | F-C-L | F-L-L | F-C-L | S-L-H |
| F-C-H | S-L-L | F-C-L | F-C-L | F-C-L | F-C-L | S-C-L | F-C-L |
| F-R-L | F-L-L | S-L-L | F-R-H | F-C-H | S-C-L | F-L-H | F-C-L |
| F-L-L | F-R-H | F-L-L | F-L-L | F-L-H | S-C-H | S-L-L | F-C-H |
| F-L-H | S-R-H | F-L-L | F-L-H | F-R-H | S-R-H | S-C-H | S-L-H |
| S-L-H | F-C-L | F-R-H | F-C-H | F-R-H | S-L-H | S-L-H | S-C-H |
| S-C-H | S-L-H | S-L-H | F-L-L | S-C-H | S-C-L | S-L-H | F-R-H |
| F-C-L | S-L-H | F-C-L | S-C-L | S-C-L | S-L-L | S-R-H | F-R-H |
| S-R-H | S-C-L | S-R-H | S-C-H | S-R-H | F-L-H | F-C-L | F-C-L |
| F-R-L | S-C-L | S-C-H | S-C-H | F-R-L | F-R-H | F-L-H | F-L-H |
| F-R-H | F-C-L | F-L-H | S-R-L | F-L-L | S-R-L | F-R-H | S-R-H |
| S-L-L | F-L-L | F-C-H | F-R-H | S-R-H | F-R-L | S-L-L | F-L-L |
| F-L-H | S-R-L | F-R-L | F-R-L | S-L-H | S-C-H | F-R-L | S-R-H |
| F-C-L | S-R-L | S-L-H | F-C-H | S-R-L | F-C-H | S-C-L | F-L-L |
| S-C-L | F-C-L | F-C-H | S-C-H | S-L-H | S-C-L | F-C-H | S-R-L |
| F-R-L | S-C-H | S-L-L | S-L-L | S-R-L | S-L-L | F-L-L | F-C-H |
| S-R-L | F-L-H | S-C-L | S-R-H | F-C-L | S-R-L | S-L-L | S-R-L |
| S-C-H | F-R-L | S-C-L | F-L-H | F-L-L | S-C-H | F-R-H | F-C-H |

## ORDER OF PRESENTATION OF EXPERIMENTAL CONDITIONS (CONT'D)

| Subject 4531 | | Subject 4632 | | Subject 4732 | | Subject 4832 | |
|---|---|---|---|---|---|---|---|
| S-L-L | S-L-H | S-R-H | S-R-L | S-R-L | S-C-L | F-C-H | S-C-L |
| S-C-L | F-R-H | S-R-L | S-C-L | S-C-L | F-R-H | S-L-L | S-R-L |
| F-R-H | S-R-L | F-C-L | F-L-L | F-R-L | F-L-H | S-L-L | S-L-L |
| S-L-H | S-R-L | F-R-L | F-R-L | F-C-L | F-R-H | F-C-H | F-C-L |
| F-L-L | S-C-H | F-C-H | F-R-L | S-L-L | S-C-L | S-L-L | F-R-H |
| F-L-H | S-C-L | F-R-L | F-R-H | S-C-H | F-L-H | F-R-L | F-L-L |
| F-R-L | F-C-H | F-L-L | F-L-H | S-C-H | S-L-H | F-C-H | S-C-H |
| F-R-H | S-L-L | F-R-H | S-C-H | F-R-L | S-R-L | F-L-H | F-R-H |
| S-L-L | F-C-H | F-L-L | S-L-L | F-C-H | S-R-H | S-R-H | F-R-L |
| S-C-H | F-C-L | S-L-H | F-L-H | F-L-H | S-C-H | S-C-L | S-L-H |
| F-R-L | S-L-H | F-R-L | S-C-L | F-C-H | F-R-L | F-R-H | S-R-L |
| F-L-L | S-C-H | S-C-L | S-R-H | F-R-H | F-R-H | S-R-L | F-C-H |
| S-R-L | F-C-L | F-L-L | F-R-H | S-R-L | F-L-L | F-C-L | S-L-H |
| S-C-H | F-L-L | F-L-H | F-C-L | S-L-L | S-L-H | F-R-L | S-C-H |
| F-R-H | S-R-L | S-R-L | F-L-L | S-R-H | S-C-H | F-R-L | F-L-H |
| F-C-L | F-L-L | S-R-H | S-C-H | S-R-H | F-R-L | S-L-H | F-R-L |
| F-R-L | F-R-L | S-L-H | S-L-H | F-R-L | S-R-L | F-L-H | F-C-L |
| F-C-H | F-R-H | S-R-H | S-L-L | F-L-H | F-C-L | S-C-H | S-R-H |
| S-C-L | S-R-H | F-C-H | S-C-H | S-L-L | F-C-L | F-L-L | S-C-L |
| S-L-L | F-C-L | S-L-L | F-C-H | F-L-L | S-L-L | F-R-H | F-L-H |
| S-R-H | S-L-L | F-C-H | S-L-H | F-L-H | S-L-L | S-C-L | S-L-L |
| S-C-H | F-L-H | S-C-H | F-C-H | S-C-H | F-C-H | S-C-H | F-R-L |
| F-L-H | F-C-H | S-L-H | S-R-H | S-L-H | F-L-H | S-R-L | S-C-H |
| S-C-L | S-R-H | S-R-L | S-L-L | S-C-L | S-L-H | S-C-H | F-R-H |
| S-C-H | F-L-L | F-R-H | F-C-H | F-R-H | F-C-L | F-L-L | S-L-H |
| S-L-L | F-C-L | F-L-H | F-L-L | F-C-L | S-R-H | S-L-H | S-R-L |
| S-C-L | S-L-H | F-L-H | F-R-L | F-C-H | F-L-L | F-C-L | S-C-L |
| S-R-L | F-C-H | S-C-H | S-L-H | F-R-H | F-C-H | F-R-H | S-R-H |
| F-L-H | S-L-H | S-R-H | F-C-H | S-L-L | F-L-L | S-R-H | S-C-L |
| F-L-H | S-L-L | S-C-L | S-R-H | F-R-L | S-L-L | F-R-H | S-C-H |
| F-R-L | S-C-L | S-C-H | S-R-L | F-C-L | S-R-L | F-R-L | F-L-H |
| F-C-H | S-R-H | F-L-L | F-R-H | S-R-L | S-C-H | S-L-H | F-C-H |
| F-C-L | F-R-L | S-L-H | S-R-H | F-L-L | S-L-H | S-C-L | F-L-L |
| F-C-H | S-C-L | F-R-L | S-L-H | S-L-H | S-C-L | F-L-H | F-L-L |
| F-C-L | F-L-H | F-C-L | S-C-L | S-R-H | F-L-L | S-C-L | S-L-L |
| F-R-H | F-L-H | S-C-L | F-C-L | S-L-H | F-C-L | F-L-L | S-L-H |
| S-R-H | S-C-L | S-L-L | F-L-H | F-C-L | F-R-L | F-C-L | F-C-H |
| S-R-L | S-R-L | F-C-L | S-C-L | F-C-H | F-C-H | S-R-H | S-R-L |
| F-C-H | F-L-H | F-R-H | S-L-L | F-R-H | F-R-H | S-L-H | F-C-L |
| F-L-L | S-R-H | F-L-H | F-L-H | S-C-H | F-C-H | S-R-L | F-R-L |
| S-R-H | S-C-H | F-R-H | F-L-L | S-C-L | S-R-L | S-C-H | F-C-L |
| S-R-H | S-C-H | S-R-L | F-C-L | F-L-L | S-C-L | F-C-H | F-R-H |
| S-C-H | F-R-L | S-C-L | S-R-L | F-L-H | S-R-H | F-L-L | F-L-H |
| F-C-L | F-R-L | F-R-L | F-C-L | F-L-L | S-R-H | S-L-L | S-L-L |
| S-L-H | S-L-L | F-C-H | S-C-H | S-C-L | S-C-H | F-C-H | S-R-H |
| F-L-L | F-L-L | S-C-H | S-R-H | S-L-H | F-L-H | S-R-L | F-L-L |
| S-L-H | F-R-H | S-L-L | F-R-H | S-R-L | S-L-L | F-C-L | S-R-H |
| S-R-L | F-R-H | S-L-L | F-R-L | S-R-H | F-R-L | S-R-H | F-C-H |

## ORDER OF PRESENTATION OF EXPERIMENTAL CONDITIONS (CONT'D)

| Subject 4932 | | Subject 5032 | | Subject 5132 | | Subject 5232 | |
|---|---|---|---|---|---|---|---|
| S-R-L | F-R-L | S-R-L | F-C-L | S-L-H | S-L-H | F-R-H | F-R-H |
| S-R-L | F-R-L | S-L-L | F-C-L | S-C-H | F-C-L | S-L-L | F-L-L |
| S-R-H | F-L-L | S-C-H | S-C-H | S-C-L | F-R-L | F-L-H | S-R-L |
| F-R-H | F-R-H | F-L-H | F-R-L | F-R-L | F-C-L | S-L-L | F-R-L |
| S-C-H | F-L-L | F-C-H | S-R-L | F-L-H | S-R-L | F-L-L | S-C-H |
| F-C-L | F-C-H | F-R-H | S-R-H | S-L-L | F-L-H | S-R-H | F-C-H |
| F-L-L | S-C-L | S-L-L | S-L-L | F-L-H | F-C-H | S-C-L | F-R-H |
| F-L-H | F-L-H | F-L-L | F-L-L | S-L-H | S-L-H | F-R-L | S-L-L |
| F-C-H | F-C-L | S-C-H | S-L-L | S-R-L | F-C-H | F-R-L | F-L-L |
| S-L-L | F-R-L | F-L-H | S-R-L | S-C-L | S-R-H | F-R-H | S-R-L |
| S-R-H | F-C-L | S-C-L | S-C-H | F-R-L | S-L-L | F-L-H | S-R-H |
| S-C-H | S-C-H | S-L-H | F-R-L | F-R-H | F-L-L | F-C-L | F-L-H |
| S-C-L | S-L-H | S-R-L | S-C-L | S-R-L | F-L-L | S-C-H | S-L-H |
| F-R-L | F-L-L | F-L-L | S-L-H | F-C-L | S-R-H | F-L-H | F-L-H |
| F-R-L | F-L-H | S-C-H | S-C-L | S-R-H | F-L-L | S-C-L | F-L-L |
| F-L-H | S-R-H | F-R-L | F-L-H | S-C-H | S-C-L | F-R-L | S-C-L |
| F-R-H | S-R-L | S-C-H | F-R-H | F-L-H | F-R-L | S-R-L | S-L-H |
| S-C-H | F-R-H | F-R-H | S-R-L | S-C-H | S-L-H | S-L-H | F-C-L |
| S-R-L | S-L-L | F-L-L | F-R-L | F-L-L | F-R-H | F-C-H | S-R-H |
| S-C-H | F-C-L | F-L-H | F-C-H | F-R-L | S-C-L | S-L-L | S-C-H |
| F-R-L | F-C-H | S-C-L | F-L-L | F-C-H | S-R-L | S-C-H | F-C-H |
| F-R-H | S-C-H | F-C-L | F-L-C | F-C-H | F-L-H | F-R-H | F-R-L |
| S-L-L | F-C-L | F-C-H | S-C-L | F-R-H | S-C-H | S-L-H | S-L-H |
| S-C-L | S-C-L | F-C-L | F-R-H | S-L-L | S-C-H | S-C-L | F-C-L |
| S-L-H | F-R-L | F-L-L | S-L-L | S-R-L | S-C-H | S-C-H | S-L-L |
| F-L-H | F-L-H | F-R-L | S-L-H | F-L-L | S-L-L | S-R-L | F-L-H |
| S-C-L | S-L-L | S-C-L | F-L-H | F-R-H | F-C-H | S-L-H | S-R-H |
| F-R-H | S-R-L | S-L-H | F-R-H | F-C-H | F-R-L | F-C-L | S-C-H |
| S-C-H | S-L-H | F-R-H | S-C-L | S-L-L | S-C-L | S-C-L | S-R-L |
| F-L-L | F-R-H | S-L-H | S-R-H | F-C-L | S-C-H | F-L-L | S-C-L |
| S-R-H | S-L-H | S-R-H | S-L-H | F-C-L | S-R-L | S-C-H | S-C-L |
| F-C-H | F-L-L | S-L-L | S-R-H | S-C-H | S-R-L | F-R-H | F-R-H |
| F-C-L | S-R-H | S-R-H | S-L-H | S-L-H | S-C-L | F-C-H | F-R-L |
| F-L-H | F-L-H | S-R-L | S-L-L | F-C-H | S-L-L | S-L-H | F-L-L |
| F-L-L | F-C-H | S-R-L | F-R-L | F-R-L | F-R-H | S-R-H | S-L-L |
| F-C-H | F-C-H | S-C-H | F-L-H | S-C-L | F-C-H | S-L-L | S-C-H |
| S-R-H | F-L-L | F-L-L | F-C-H | F-C-L | F-R-H | F-C-L | S-R-L |
| S-L-L | F-R-L | F-R-H | F-C-L | S-C-L | F-R-L | F-C-H | S-L-H |
| S-C-L | S-R-H | F-R-L | F-L-H | F-R-H | F-C-L | F-L-L | S-R-H |
| F-C-H | S-L-L | F-L-H | F-C-L | F-L-L | F-L-L | F-R-L | F-R-H |
| S-L-L | S-R-H | F-C-H | S-L-L | S-R-H | S-R-H | F-C-L | F-C-L |
| S-R-L | S-C-L | S-C-H | S-R-H | S-R-L | S-L-H | S-R-L | F-C-H |
| S-R-L | S-R-L | F-L-L | F-C-H | S-R-H | F-C-H | S-R-L | F-L-H |
| F-R-H | F-C-L | F-R-H | S-R-H | F-L-H | F-L-H | S-R-H | F-C-H |
| S-L-L | S-C-L | S-R-L | S-C-L | S-R-H | F-L-H | F-L-H | F-R-L |
| S-L-H | F-C-L | F-R-L | F-C-L | S-L-H | S-R-H | S-R-H | S-L-L |
| S-C-H | S-L-H | F-C-H | S-R-H | S-L-L | F-C-L | F-L-L | S-C-L |
| S-L-H | S-L-L | S-L-H | F-C-H | F-L-L | S-L-L | F-C-H | F-C-L |

## ORDER OF PRESENTATION OF EXPERIMENTAL CONDITIONS (CONT'D)

| Subject 5332 | | Subject 5432 | |
|---|---|---|---|
| F-C-L | S-R-L | F-C-H | F-C-L |
| F-C-H | F-L-H | S-R-L | S-R-L |
| S-R-L | S-L-H | S-C-H | S-L-H |
| S-L-H | F-C-H | F-C-L | S-R-H |
| F-R-L | S-L-L | S-C-L | S-L-H |
| F-R-L | S-R-L | F-L-L | S-C-H |
| F-L-L | F-C-L | F-L-L | F-L-H |
| F-R-H | F-L-L | F-R-H | S-R-L |
| F-L-L | F-R-H | S-L-L | F-L-L |
| F-R-H | F-C-H | F-C-H | F-C-H |
| F-C-L | S-C-L | F-R-L | F-L-L |
| S-L-L | S-R-H | S-L-H | S-L-L |
| S-C-H | F-R-L | S-C-L | F-R-H |
| S-R-H | F-R-H | F-C-H | F-L-L |
| S-R-H | S-C-H | F-R-H | S-R-L |
| F-L-H | F-L-L | S-R-L | S-R-H |
| S-R-H | F-C-L | F-C-L | F-C-L |
| S-C-L | F-L-H | S-C-H | S-C-L |
| F-L-L | S-C-H | F-L-H | F-C-H |
| S-L-H | S-L-H | S-R-H | F-R-L |
| S-L-H | F-L-L | F-L-H | S-C-L |
| F-C-H | S-R-H | F-L-L | F-R-H |
| S-R-L | S-R-L | S-R-H | S-L-H |
| F-R-H | S-C-H | S-C-H | F-C-L |
| F-R-L | F-R-H | S-C-L | S-C-H |
| S-C-H | S-C-L | S-R-L | S-C-L |
| S-C-L | S-L-L | F-C-L | F-R-L |
| F-C-L | F-C-H | S-L-L | S-R-L |
| S-L-H | S-C-L | S-L-H | S-R-H |
| F-C-L | S-R-L | S-C-L | S-L-L |
| S-C-L | F-L-H | S-R-H | F-R-H |
| F-R-L | F-R-L | F-R-L | F-C-H |
| F-L-H | S-L-H | S-C-H | S-C-H |
| F-C-H | S-C-H | F-L-H | S-L-L |
| S-C-L | S-L-H | S-L-L | F-C-L |
| S-C-H | F-C-L | F-R-H | F-R-L |
| S-L-L | S-R-H | F-R-L | S-C-H |
| S-L-L | S-C-L | S-R-H | S-L-H |
| F-L-H | F-L-L | F-C-L | F-R-L |
| F-L-L | F-R-H | F-L-L | F-L-H |
| S-R-L | S-R-H | F-R-H | F-L-H |
| F-R-H | F-C-L | S-R-L | F-L-L |
| S-R-H | F-R-L | F-R-L | F-R-H |
| F-L-H | F-C-H | F-C-H | S-C-L |
| S-C-H | F-L-H | S-L-L | S-R-H |
| F-C-H | S-L-L | S-L-H | F-L-H |
| S-L-L | F-R-L | S-L-H | F-C-H |
| S-R-L | S-L-L | F-L-H | S-L-L |

## RAW SCORES--REACTION TIME

| SUBJECT IDENTIFICATION | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 01JH | SRL | .90 | .99 | .81 | .63 | .63 | .64 | .72 | .76 |
| 01JH | SRH | .90 | .96 | .62 | .45 | .41 | .45 | .44 | .45 |
| 01JH | SCL | .73 | .71 | .71 | .32 | .47 | .37 | .47 | .47 |
| 01JH | SCH | .75 | .51 | .95 | .43 | .39 | .74 | .35 | .59 |
| 01JH | SLL | .54 | .40 | .40 | .64 | .47 | .59 | .40 | .49 |
| 01JH | SLH | .44 | .63 | .45 | .55 | .45 | .59 | .51 | .51 |
| 01JH | FRL | .86 | .34 | .31 | .37 | .31 | .39 | .37 | .36 |
| 01JH | FRH | .52 | .39 | .37 | .28 | .21 | .31 | .22 | .32 |
| 01JH | FCL | .50 | .49 | .43 | .39 | .32 | .61 | .49 | .46 |
| 01JH | FCH | .52 | .52 | .43 | .52 | .42 | .22 | .33 | .42 |
| 01JH | FLL | .45 | .52 | .43 | .48 | .25 | .30 | .32 | .39 |
| 01JH | FLH | .46 | .33 | .40 | .40 | .42 | .40 | .43 | .40 |
| 02JH | SRL | .37 | .30 | .29 | .26 | .22 | .29 | .22 | .28 |
| 02JH | SRH | .30 | .33 | .28 | .22 | .25 | .21 | .20 | .25 |
| 02JH | SCL | .49 | .47 | .45 | .40 | .31 | .37 | .20 | .38 |
| 02JH | SCH | .50 | .29 | .51 | .33 | .56 | .41 | .53 | .45 |
| 02JH | SLL | .72 | .72 | .65 | .42 | .45 | .33 | .72 | .57 |
| 02JH | SLH | .40 | .59 | .31 | .30 | .37 | .49 | .35 | .40 |
| 02JH | FRL | .39 | .29 | .37 | .30 | .34 | .32 | .35 | .34 |
| 02JH | FRH | .34 | .37 | .29 | .29 | .26 | .31 | .22 | .29 |
| 02JH | FCL | .35 | .38 | .40 | .33 | .40 | .40 | .35 | .37 |
| 02JH | FCH | .46 | .52 | .32 | .28 | .25 | .25 | .24 | .33 |
| 02JH | FLL | .36 | .33 | .27 | .24 | .35 | .22 | .33 | .30 |
| 02JH | FLH | .41 | .35 | .26 | .31 | .37 | .24 | .31 | .32 |
| 03JH | SRL | .20 | .27 | .35 | .28 | .24 | .33 | .28 | .26 |
| 03JH | SRH | .22 | .24 | .33 | .24 | .22 | .22 | .22 | .26 |
| 03JH | SCL | .32 | .40 | .31 | .30 | .22 | .23 | .29 | .30 |
| 03JH | SCH | .39 | .28 | .52 | .35 | .25 | .54 | .23 | .25 |
| 03JH | SLL | .36 | .27 | .27 | .27 | .26 | .30 | .26 | .20 |
| 03JH | SLH | .34 | .27 | .29 | .30 | .22 | .30 | .40 | .31 |
| 03JH | FRL | .23 | .32 | .30 | .31 | .37 | .38 | .20 | .37 |
| 03JH | FRH | .25 | .31 | .44 | .35 | .34 | .36 | .37 | .35 |
| 03JH | FCL | .39 | .28 | .30 | .31 | .29 | .28 | .29 | .31 |
| 03JH | FCH | .43 | .21 | .30 | .32 | .36 | .35 | .37 | .22 |
| 03JH | FLL | .34 | .29 | .38 | .38 | .45 | .22 | .46 | .45 |
| 03JH | FLH | .43 | .22 | .31 | .29 | .35 | .29 | .24 | .22 |
| 04JH | SRL | .39 | .33 | .33 | .36 | .38 | .37 | .33 | .38 |
| 04JH | SRH | .39 | .31 | .36 | .34 | .36 | .34 | .21 | .40 |
| 04JH | SCL | .38 | .33 | .35 | .32 | .23 | .22 | .36 | .34 |
| 04JH | SCH | .44 | .42 | .36 | .34 | .37 | .38 | .39 | .24 |
| 04JH | SLL | .32 | .30 | .23 | .28 | .25 | .27 | .29 | .27 |
| 04JH | SLH | .37 | .27 | .29 | .27 | .27 | .27 | .22 | .21 |
| 04JH | FRL | .32 | .32 | .41 | .36 | .33 | .35 | .37 | .39 |
| 04JH | FRH | .36 | .32 | .26 | .27 | .24 | .25 | .21 | .22 |
| 04JH | FCL | .50 | .43 | .36 | .32 | .21 | .24 | .24 | .24 |

## RAW SCORES--REACTION TIME

| SUBJECT IDENTI- FICATION | CONDI- TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 04JH | FCH | .47 | .38 | .41 | .31 | .22 | .25 | .21 | .20 |
| 04JH | FLL | .36 | .31 | .24 | .27 | .21 | .25 | .23 | .29 |
| 04JH | FLH | .39 | .25 | .28 | .28 | .23 | .27 | .26 | .28 |
| 05JH | SRL | .30 | .37 | .50 | .35 | .38 | .37 | .34 | .39 |
| 05JH | SRH | .28 | .21 | .19 | .27 | .20 | .20 | .23 | .23 |
| 05JH | SCL | .49 | .53 | .52 | .49 | .40 | .48 | .43 | .48 |
| 05JH | SCH | .44 | .26 | .28 | .32 | .27 | .26 | .26 | .31 |
| 05JH | SLL | .30 | .27 | .26 | .27 | .25 | .26 | .21 | .26 |
| 05JH | SLH | .36 | .28 | .31 | .34 | .36 | .33 | .38 | .34 |
| 05JH | FRL | .31 | .34 | .29 | .53 | .35 | .31 | .39 | .36 |
| 05JH | FRH | .28 | .30 | .33 | .27 | .25 | .24 | .29 | .27 |
| 05JH | FCL | .41 | .39 | .36 | .33 | .34 | .33 | .36 | .36 |
| 05JH | FCH | .33 | .38 | .27 | .35 | .30 | .31 | .31 | .31 |
| 05JH | FLL | .32 | .30 | .23 | .34 | .31 | .30 | .35 | .31 |
| 05JH | FLH | .29 | .26 | .23 | .26 | .21 | .21 | .21 | .23 |
| 06JH | SRL | .22 | .63 | .54 | .44 | .60 | .57 | .50 | .50 |
| 06JH | SRH | .32 | .28 | .27 | .30 | .36 | .45 | .21 | .31 |
| 06JH | SCL | .36 | .32 | .48 | .47 | .31 | .44 | .40 | .36 |
| 06JH | SCH | .40 | .40 | .43 | .47 | .30 | .37 | .43 | .40 |
| 06JH | SLL | .27 | .27 | .47 | .20 | .21 | .21 | .27 | .27 |
| 06JH | SLH | .32 | .37 | .33 | .32 | .22 | .26 | .29 | .30 |
| 06JH | FRL | .22 | .29 | .25 | .20 | .21 | .22 | .35 | .25 |
| 06JH | FRH | .28 | .29 | .29 | .21 | .38 | .25 | .33 | .29 |
| 06JH | FCL | .46 | .45 | .41 | .38 | .32 | .37 | .38 | .40 |
| 06JH | FCH | .44 | .26 | .27 | .26 | .30 | .29 | .25 | .29 |
| 06JH | FLL | .29 | .21 | .32 | .29 | .25 | .26 | .26 | .27 |
| 06JH | FLH | .22 | .29 | .31 | .32 | .22 | .28 | .22 | .26 |
| 07JH | SRL | .83 | .80 | .78 | .63 | .72 | .88 | .77 | .73 |
| 07JH | SRH | .48 | .75 | .71 | .79 | .71 | .75 | .78 | .74 |
| 07JH | SCL | .50 | .72 | .61 | .61 | .66 | .59 | .62 | .58 |
| 07JH | SCH | .57 | .54 | .57 | .64 | .64 | .52 | .57 | .51 |
| 07JH | SLL | .42 | .27 | .48 | .27 | .49 | .57 | .60 | .73 |
| 07JH | SLH | .43 | .79 | .70 | .76 | .74 | .73 | .70 | .76 |
| 07JH | FRL | .46 | .82 | .71 | .81 | .75 | .69 | .70 | .74 |
| 07JH | FRH | .40 | .52 | .40 | .33 | .36 | .39 | .48 | .33 |
| 07JH | FCL | .38 | .62 | .43 | .60 | .48 | .45 | .41 | .47 |
| 07JH | FCH | .32 | .26 | .36 | .49 | .30 | .40 | .39 | .40 |
| 07JH | FLL | .28 | .32 | .32 | .22 | .41 | .33 | .30 | .39 |
| 07JH | FLH | .32 | .34 | .32 | .29 | .27 | .33 | .32 | .35 |
| 08JH | SRL | .88 | .48 | .68 | .67 | .67 | .71 | .72 | .63 |
| 08JH | SRH | .82 | .80 | .83 | .89 | .87 | .80 | .82 | .84 |
| 08JH | SCL | .31 | .39 | .39 | .30 | .37 | .64 | .39 | .36 |
| 08JH | SCH | .57 | .62 | .68 | .68 | .73 | .67 | .77 | .70 |
| 08JH | SLL | .43 | .31 | .38 | .46 | .45 | .43 | .30 | .38 |
| 08JH | SLH | .44 | .58 | .52 | .52 | .58 | .56 | .51 | .51 |
| 08JH | FRL | .81 | .75 | .75 | .79 | .72 | .71 | .73 | .75 |
| 08JH | FRH | .75 | .81 | .73 | .73 | .63 | .72 | .77 | .72 |

## RAW SCORES--REACTION TIME (CONT'D)

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 08JH | FCL | .47 | .60 | .47 | .40 | .47 | .45 | .47 | .41 |
| 08JH | FCH | .71 | .53 | .56 | .57 | .56 | .50 | .54 | .54 |
| 08JH | FLL | .36 | .37 | .30 | .37 | .23 | .29 | .22 | .24 |
| 08JH | FLH | .32 | .37 | .30 | .34 | .28 | .27 | .32 | .26 |
| 09JH | SRL | .71 | .81 | .74 | .68 | .62 | .68 | .64 | .55 |
| 09JH | SRH | .68 | .69 | .61 | .50 | .60 | .60 | .52 | .57 |
| 09JH | SCL | .42 | .63 | .67 | .41 | .51 | .51 | .49 | .54 |
| 09JH | SCH | .69 | .74 | .77 | .79 | .70 | .72 | .62 | .72 |
| 09JH | SLL | .40 | .33 | .33 | .34 | .23 | .30 | .30 | .22 |
| 09JH | SLH | .34 | .32 | .25 | .20 | .25 | .27 | .35 | .27 |
| 09JH | FRL | .42 | .68 | .68 | .55 | .62 | .62 | .67 | .47 |
| 09JH | FRH | .51 | .36 | .46 | .40 | .39 | .40 | .42 | .32 |
| 09JH | FCL | .52 | .50 | .63 | .55 | .51 | .55 | .55 | .56 |
| 09JH | FCH | .45 | .39 | .47 | .40 | .37 | .38 | .30 | .30 |
| 09JH | FLL | .37 | .32 | .36 | .23 | .21 | .29 | .29 | .32 |
| 09JH | FLH | .31 | .33 | .35 | .24 | .25 | .30 | .26 | .31 |
| 10JL | SRL | .86 | .59 | .29 | .49 | .46 | .36 | .24 | .40 |
| 10JL | SRH | .70 | .72 | .32 | .12 | .39 | .11 | .12 | .35 |
| 10JL | SCL | .87 | .61 | .77 | .13 | .59 | .48 | .57 | .72 |
| 10JL | SCH | .80 | .59 | .80 | .18 | .53 | .51 | .25 | .62 |
| 10JL | SLL | .50 | .46 | .39 | .19 | .35 | .25 | .27 | .39 |
| 10JL | SLH | .42 | .43 | .44 | .47 | .40 | .40 | .34 | .21 |
| 10JL | FRL | .52 | .52 | .67 | .45 | .50 | .58 | .53 | .19 |
| 10JL | FRH | .60 | .37 | .38 | .13 | .28 | .11 | .25 | .14 |
| 10JL | FCL | .44 | .52 | .48 | .48 | .43 | .40 | .43 | .19 |
| 10JL | FCH | .51 | .56 | .32 | .21 | .33 | .36 | .22 | .35 |
| 10JL | FLL | .49 | .45 | .34 | .22 | .29 | .28 | .21 | .27 |
| 10JL | FLH | .51 | .45 | .42 | .43 | .42 | .34 | .44 | .37 |
| 11JL | SRL | .98 | .85 | 1.19 | .88 | .90 | .60 | .72 | .69 |
| 11JL | SRH | 1.07 | 1.03 | 1.04 | 1.04 | .67 | .58 | .77 | .81 |
| 11JL | SCL | .87 | .83 | .93 | .87 | .67 | .83 | .75 | .76 |
| 11JL | SCH | .85 | .85 | 1.03 | .82 | .87 | .55 | .69 | .77 |
| 11JL | SLL | .67 | .54 | .60 | .62 | .60 | .41 | .36 | .53 |
| 11JL | SLH | .58 | .84 | .76 | .93 | .86 | .84 | .88 | .60 |
| 11JL | FRL | .98 | .94 | 1.19 | .93 | .83 | .96 | .89 | .98 |
| 11JL | FRH | .72 | .92 | .92 | .92 | .97 | .76 | .65 | 1.00 |
| 11JL | FCL | .72 | .85 | .96 | .87 | .85 | .79 | .85 | .74 |
| 11JL | FCH | .90 | .75 | .73 | .90 | 1.29 | .75 | .63 | .75 |
| 11JL | FLL | .62 | .37 | .72 | .39 | .37 | .34 | .47 | .37 |
| 11JL | FLH | .86 | .51 | .59 | .38 | .75 | .51 | .54 | .60 |
| 12JL | SRL | .55 | .99 | 1.33 | 1.44 | 1.40 | 1.46 | 1.32 | 1.39 |
| 12JL | SRH | .75 | .94 | .91 | .75 | .76 | .87 | .69 | .76 |
| 12JL | SCL | .65 | .64 | 1.19 | .41 | .46 | .51 | .55 | .54 |
| 12JL | SCH | .71 | 1.21 | .88 | .82 | .59 | .95 | .86 | .87 |
| 12JL | SLL | .59 | .60 | .56 | .50 | .46 | .32 | .44 | .58 |
| 12JL | SLH | .47 | .61 | .48 | .55 | .55 | .70 | .52 | .55 |
| 12JL | FRL | .82 | 1.00 | .86 | .48 | .65 | .71 | .83 | .84 |
| 12JL | FRH | .90 | .96 | 1.04 | .79 | .63 | .73 | .76 | .79 |

## RAW SCORES--REACTION TIME (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 12JL | FCL | .47 | .72 | .41 | .40 | .56 | .42 | .69 | .46 |
| 12JL | FCH | .56 | .46 | .98 | .79 | .54 | .54 | .40 | .56 |
| 12JL | FLL | .57 | .55 | .50 | .57 | .39 | .27 | .46 | .57 |
| 12JL | FLH | .54 | .40 | .55 | .48 | .25 | .85 | .46 | .50 |
| 13JL | SRL | .85 | .87 | .86 | 1.05 | .83 | .80 | .84 | .78 |
| 13JL | SRH | .87 | 1.00 | .97 | .82 | .88 | .32 | .88 | .81 |
| 13JL | SCL | .35 | .58 | .71 | 1.08 | .36 | .33 | .65 | .32 |
| 13JL | SCH | .86 | .88 | .97 | .86 | .61 | .60 | .93 | .24 |
| 13JL | SLL | .39 | .53 | .45 | .52 | .30 | .33 | .35 | .34 |
| 13JL | SLH | .39 | .53 | .51 | .42 | .38 | .33 | .35 | .37 |
| 13JL | FRL | .95 | .94 | .83 | 1.11 | .91 | .82 | .35 | .99 |
| 13JL | FRH | .76 | .79 | .92 | .46 | .73 | .78 | .60 | .92 |
| 13JL | FCL | .53 | .55 | .58 | .51 | .30 | .56 | .42 | .37 |
| 13JL | FCH | .39 | .60 | .59 | .34 | .34 | .41 | .32 | .37 |
| 13JL | FLL | .54 | .47 | .55 | .55 | .66 | .31 | .32 | .53 |
| 13JL | FLH | .56 | .57 | .55 | .57 | .56 | .29 | .24 | .47 |
| 14JL | SRL | .37 | .39 | .47 | .51 | .27 | .36 | .36 | .23 |
| 14JL | SRH | .38 | 1.06 | .81 | .27 | .72 | .32 | .27 | .30 |
| 14JL | SCL | .61 | .27 | .64 | .31 | .29 | .29 | .23 | .35 |
| 14JL | SCH | .69 | .72 | .56 | 1.00 | .63 | .75 | .79 | .89 |
| 14JL | SLL | .54 | .61 | .51 | .37 | .33 | .32 | .27 | .29 |
| 14JL | SLH | .49 | .51 | .51 | .33 | .30 | .39 | .41 | .37 |
| 14JL | FRL | .93 | .87 | .87 | .51 | .81 | .83 | .78 | .77 |
| 14JL | FRH | .79 | .88 | .83 | .72 | .79 | .75 | .59 | .76 |
| 14JL | FCL | .40 | .41 | .95 | .31 | .54 | .47 | .26 | .49 |
| 14JL | FCH | .38 | .46 | .40 | .39 | .33 | .36 | .30 | .40 |
| 14JL | FLL | .38 | .35 | .44 | .38 | .71 | .34 | .38 | .29 |
| 14JL | FLH | 1.01 | .48 | .51 | .39 | .59 | .58 | .66 | .50 |
| 15JL | SRL | .81 | .80 | .79 | .24 | .84 | .81 | .87 | .86 |
| 15JL | SRH | .86 | .76 | .87 | .33 | .89 | .75 | .78 | .75 |
| 15JL | SCL | .81 | .36 | .39 | .45 | .58 | .39 | .25 | .31 |
| 15JL | SCH | .48 | .52 | .57 | .49 | .46 | .37 | .40 | .28 |
| 15JL | SLL | .46 | .48 | .29 | .45 | .71 | .45 | .79 | .49 |
| 15JL | SLH | .50 | .42 | .50 | .55 | .68 | .56 | .52 | .71 |
| 15JL | FRL | .67 | .36 | .68 | .19 | .31 | .31 | .29 | .21 |
| 15JL | FRH | .26 | .64 | .44 | .26 | .20 | .25 | .22 | .20 |
| 15JL | FCL | .63 | .35 | .27 | .21 | .50 | .39 | .34 | .37 |
| 15JL | FCH | .40 | .49 | .61 | .36 | .32 | .37 | .28 | .37 |
| 15JL | FLL | .28 | .51 | .44 | .67 | .59 | .50 | .78 | .49 |
| 15JL | FLH | .54 | .37 | .67 | .37 | .30 | .38 | .59 | .38 |
| 16JL | SRL | .39 | .85 | .63 | .40 | .66 | .61 | .55 | .67 |
| 16JL | SRH | .80 | .40 | .67 | .63 | .50 | .74 | .82 | .74 |
| 16JL | SCL | .53 | .86 | .74 | .33 | .40 | .49 | .67 | .48 |
| 16JL | SCH | .71 | .25 | .31 | .70 | .56 | .65 | .69 | .65 |
| 16JL | SLL | .50 | .48 | .48 | .48 | .44 | .31 | .38 | .41 |
| 16JL | SLH | .49 | .21 | .38 | .35 | .28 | .26 | .22 | .25 |
| 16JL | FRL | .65 | .66 | .59 | .68 | .66 | .63 | .60 | .64 |
| 16JL | FRH | .33 | .59 | .41 | .30 | .37 | .34 | .35 | .36 |

## RAW SCORES--REACTION TIME (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 16JL | FCL | .41 | .55 | .44 | .40 | .38 | .38 | .38 | .39 |
| 16JL | FCH | .42 | .43 | .43 | .54 | .48 | .51 | .52 | .46 |
| 16JL | FLL | .27 | .40 | .38 | .38 | .35 | .34 | .38 | .39 |
| 16JL | FLH | .55 | .46 | .49 | .45 | .40 | .46 | .48 | .47 |
| 17JL | SRL | .55 | .56 | .88 | .57 | .45 | .71 | .27 | .35 |
| 17JL | SRH | .53 | .52 | .66 | .66 | .34 | .51 | .43 | .43 |
| 17JL | SCL | .48 | .45 | .52 | .60 | .44 | .55 | .42 | .46 |
| 17JL | SCH | .49 | .57 | .53 | .50 | .38 | .40 | .46 | .43 |
| 17JL | SLL | .38 | .33 | .50 | .58 | .33 | .35 | .37 | .35 |
| 17JL | SLH | .45 | .44 | .59 | .44 | .41 | .46 | .42 | .48 |
| 17JL | FRL | .39 | .43 | .33 | .31 | .48 | .24 | .27 | .20 |
| 17JL | FRH | .70 | .61 | .77 | .71 | .76 | .59 | .70 | .74 |
| 17JL | FCL | .44 | .51 | .42 | .44 | .33 | .43 | .57 | .30 |
| 17JL | FCH | .40 | .42 | .41 | .45 | .44 | .35 | .34 | .42 |
| 17JL | FLL | .54 | .55 | .51 | .61 | .54 | .56 | .57 | .54 |
| 17JL | FLH | .36 | .32 | .51 | .37 | .32 | .32 | .38 | .30 |
| 18JL | SRL | .54 | .38 | .42 | .49 | .36 | .33 | .27 | .32 |
| 18JL | SRH | .64 | .36 | .37 | .30 | .37 | .27 | .31 | .29 |
| 18JL | SCL | .38 | .35 | .46 | .54 | .32 | .41 | .51 | .34 |
| 18JL | SCH | .41 | .40 | .36 | .40 | .27 | .37 | .20 | .45 |
| 18JL | SLL | .41 | .36 | .33 | .39 | .23 | .24 | .44 | .23 |
| 18JL | SLH | .35 | .32 | .34 | .34 | .50 | .23 | .33 | .32 |
| 18JL | FRL | .33 | .29 | .25 | .50 | .27 | .25 | .43 | .26 |
| 18JL | FRH | .63 | .75 | .80 | .87 | .40 | .70 | .77 | .72 |
| 18JL | FCL | .41 | .40 | .42 | .33 | .27 | .38 | .48 | .38 |
| 18JL | FCH | .32 | .29 | .32 | .42 | .33 | .32 | .27 | .28 |
| 18JL | FLL | .38 | .39 | .38 | .38 | .34 | .44 | .46 | .44 |
| 18JL | FLH | .33 | .40 | .39 | .34 | .40 | .44 | .30 | .49 |
| 19HH | SRL | .40 | .43 | .45 | .80 | .71 | .74 | .61 | .71 |
| 19HH | SRH | .81 | .45 | .46 | .15 | .23 | .23 | .36 | .17 |
| 19HH | SCL | .30 | .40 | .34 | .18 | .36 | .56 | .33 | .18 |
| 19HH | SCH | .46 | .55 | .34 | .21 | .59 | .51 | .41 | .19 |
| 19HH | SLL | .45 | .34 | .32 | .20 | .15 | .17 | .26 | .16 |
| 19HH | SLH | .39 | .34 | .30 | .20 | .21 | .20 | .27 | .22 |
| 19HH | FRL | .68 | .28 | .31 | .32 | .25 | .22 | .33 | .28 |
| 19HH | FRH | .29 | .43 | .39 | .21 | .22 | .21 | .29 | .27 |
| 19HH | FCL | .71 | .35 | .32 | .25 | .22 | .20 | .33 | .25 |
| 19HH | FCH | .43 | .38 | .37 | .30 | .23 | .24 | .31 | .21 |
| 19HH | FLL | .30 | .28 | .27 | .24 | .19 | .18 | .24 | .20 |
| 19HH | FLH | .35 | .36 | .28 | .16 | .15 | .18 | .24 | .18 |
| 20HH | SRL | .72 | .57 | .67 | .62 | .57 | .57 | .58 | .61 |
| 20HH | SRH | .61 | .65 | .59 | .65 | .60 | .57 | .62 | .61 |
| 20HH | SCL | .35 | .33 | .58 | .30 | .60 | .65 | .64 | .49 |
| 20HH | SCH | .45 | .42 | .37 | .59 | .46 | .33 | .33 | .38 |
| 20HH | SLL | .71 | .33 | .37 | .27 | .23 | .84 | .38 | .48 |
| 20HH | SLH | .25 | .37 | .28 | .24 | .31 | .77 | .22 | .35 |
| 20HH | FRL | .47 | .42 | .64 | .33 | .59 | .48 | .42 | .48 |
| 20HH | FRH | .40 | .45 | .38 | .41 | .55 | .46 | .62 | .47 |
| 20HH | FCL | .40 | .30 | .30 | .32 | .33 | .37 | .38 | .34 |

## RAW SCORES--REACTION TIME (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 20HH | FCH | .38 | .34 | .44 | .36 | .32 | .31 | .35 | .36 |
| 20HH | FLL | .33 | .23 | .22 | .35 | .27 | .24 | .24 | .27 |
| 20HH | FLH | .26 | .26 | .31 | .39 | .29 | .36 | .29 | .31 |
| 21HH | SRL | .54 | .69 | .49 | .67 | .70 | .37 | .62 | .27 |
| 21HH | SRH | .67 | .62 | .18 | .34 | .55 | .41 | .25 | .24 |
| 21HH | SCL | .36 | .32 | .25 | .26 | .40 | .57 | .48 | .26 |
| 21HH | SCH | .41 | .17 | .43 | .32 | .43 | .30 | .12 | .18 |
| 21HH | SLL | .23 | .20 | .17 | .20 | .21 | .25 | .22 | .23 |
| 21HH | SLH | .30 | .23 | .29 | .20 | .20 | .20 | .24 | .21 |
| 21HH | FRL | .51 | .45 | .41 | .35 | .62 | .62 | .35 | .28 |
| 21HH | FRH | .34 | .33 | .31 | .25 | .25 | .23 | .23 | .28 |
| 21HH | FCL | .34 | .29 | .33 | .34 | .25 | .31 | .22 | .30 |
| 21HH | FCH | .24 | .23 | .22 | .18 | .28 | .27 | .24 | .23 |
| 21HH | FLL | .27 | .24 | .27 | .23 | .22 | .23 | .21 | .24 |
| 21HH | FLH | .23 | .25 | .26 | .26 | .19 | .23 | .19 | .25 |
| 22HH | SRL | .71 | .67 | .71 | .56 | .67 | .77 | .58 | .66 |
| 22HH | SRH | .50 | .72 | .50 | .51 | .61 | .53 | .09 | .60 |
| 22HH | SCL | .47 | .37 | .50 | .28 | .21 | .57 | .18 | .38 |
| 22HH | SCH | .37 | .46 | 1.00 | .19 | .11 | .17 | .41 | .39 |
| 22HH | SLL | .33 | .26 | .33 | .37 | .19 | .23 | .22 | .13 |
| 22HH | SLH | .31 | .36 | .25 | .31 | .22 | .25 | .14 | .15 |
| 22HH | FRL | .65 | .64 | .54 | .42 | .19 | .24 | .41 | .27 |
| 22HH | FRH | .40 | .37 | .23 | .15 | .19 | .18 | .19 | .24 |
| 22HH | FCL | .45 | .37 | .34 | .11 | .11 | .24 | .23 | .17 |
| 22HH | FCH | .42 | .31 | .25 | .16 | .18 | .12 | .24 | .26 |
| 22HH | FLL | .36 | .34 | .26 | .14 | .22 | .16 | .12 | .13 |
| 22HH | FLH | .20 | .39 | .30 | .23 | .08 | .09 | .16 | .15 |
| 23HH | SRL | .26 | .75 | .30 | .25 | .17 | .17 | .23 | .27 |
| 23HH | SRH | .36 | .71 | .38 | .47 | .23 | .20 | .20 | .47 |
| 23HH | SCL | .54 | .27 | .35 | .45 | .20 | .24 | .52 | .20 |
| 23HH | SCH | .31 | .29 | .25 | .26 | .21 | .24 | .20 | .24 |
| 23HH | SLL | .27 | .25 | .24 | .27 | .22 | .25 | .25 | .17 |
| 23HH | SLH | .40 | .30 | .30 | .34 | .28 | .29 | .20 | .26 |
| 23HH | FRL | .34 | .44 | .32 | .22 | .50 | .27 | .23 | .24 |
| 23HH | FRH | .25 | .28 | .25 | .22 | .26 | .26 | .20 | .31 |
| 23HH | FCL | .32 | .45 | .29 | .25 | .23 | .26 | .27 | .22 |
| 23HH | FCH | .27 | .25 | .25 | .32 | .23 | .25 | .22 | .20 |
| 23HH | FLL | .22 | .25 | .23 | .30 | .25 | .25 | .19 | .18 |
| 23HH | FLH | .31 | .27 | .28 | .32 | .27 | .26 | .25 | .28 |
| 24HH | SRL | .34 | .29 | .34 | .34 | .32 | .20 | .28 | .22 |
| 24HH | SRH | .26 | .63 | .84 | .89 | .55 | .54 | .76 | .58 |
| 24HH | SCL | .35 | .49 | .50 | .44 | .49 | .89 | .36 | .43 |
| 24HH | SCH | .33 | .49 | .36 | .79 | .22 | .80 | .46 | .48 |
| 24HH | SLL | .26 | .40 | .44 | .29 | .29 | .43 | .65 | .45 |
| 24HH | SLH | .33 | .46 | .51 | .33 | .44 | .56 | .45 | .59 |
| 24HH | FRL | .35 | .27 | .26 | .31 | .24 | .29 | .25 | .20 |
| 24HH | FRH | .24 | .29 | .30 | .34 | .36 | .26 | .26 | .28 |
| 24HH | FCL | .31 | .42 | .39 | .60 | .40 | .49 | .33 | .40 |

## RAW SCORES--REACTION TIME (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 24HH | FCH | .42 | .34 | .44 | .33 | .31 | .32 | .32 | .25 |
| 24HH | FLL | .32 | .36 | .30 | .29 | .31 | .40 | .46 | .47 |
| 24HH | FLH | .31 | .31 | .33 | .30 | .27 | .40 | .28 | .28 |
| 25HH | SRL | .77 | .67 | .67 | .59 | .36 | .25 | .30 | .52 |
| 25HH | SRH | .92 | .61 | .73 | .35 | .30 | .84 | .63 | .49 |
| 25HH | SCL | .73 | .56 | .54 | .44 | .52 | .38 | .68 | .56 |
| 25HH | SCH | .66 | .47 | .62 | .59 | .33 | .32 | .27 | .47 |
| 25HH | SLL | .50 | .37 | .38 | .33 | .21 | .21 | .22 | .32 |
| 25HH | SLH | .63 | .40 | .50 | .43 | .26 | .37 | .33 | .28 |
| 25HH | FRL | .35 | .29 | .29 | .26 | .26 | .28 | .27 | .35 |
| 25HH | FRH | .50 | .37 | .37 | .42 | .38 | .32 | .33 | .27 |
| 25HH | FCL | .53 | .52 | .39 | .61 | .64 | .51 | .31 | .50 |
| 25HH | FCH | .71 | .41 | .52 | .30 | .57 | .27 | .23 | .29 |
| 25HH | FLL | .52 | .39 | .40 | .41 | .39 | .30 | .37 | .34 |
| 25HH | FLH | .42 | .39 | .37 | .57 | .29 | .37 | .29 | .24 |
| 26HH | SRL | .26 | .33 | .33 | .22 | .22 | .23 | .30 | .27 |
| 26HH | SRH | .35 | .35 | .35 | .31 | .26 | .25 | .23 | .70 |
| 26HH | SCL | .44 | .33 | .49 | .34 | .20 | .36 | .46 | .38 |
| 26HH | SCH | .32 | .49 | .37 | .46 | .20 | .28 | .22 | .25 |
| 26HH | SLL | .50 | .63 | .49 | .71 | .22 | .30 | .32 | .59 |
| 26HH | SLH | .57 | .59 | .58 | .40 | .23 | .26 | .27 | .30 |
| 26HH | FRL | .36 | .26 | .28 | .30 | .18 | .20 | .26 | .27 |
| 26HH | FRH | .37 | .33 | .23 | .25 | .21 | .29 | .20 | .24 |
| 26HH | FCL | .53 | .27 | .50 | .17 | .31 | .29 | .33 | .21 |
| 26HH | FCH | .30 | .28 | .33 | .21 | .31 | .23 | .25 | .27 |
| 26HH | FLL | .27 | .42 | .21 | .25 | .21 | .25 | .30 | .27 |
| 26HH | FLH | .34 | .22 | .30 | .23 | .28 | .33 | .26 | .28 |
| 27HH | SRL | .27 | .87 | .35 | .26 | .35 | .36 | .22 | .23 |
| 27HH | SRH | .29 | .28 | .51 | .49 | .20 | .15 | .21 | .19 |
| 27HH | SCL | .30 | .22 | .26 | .15 | .18 | .19 | .14 | .21 |
| 27HH | SCH | .25 | .20 | .23 | .21 | .23 | .23 | .18 | .30 |
| 27HH | SLL | .25 | .23 | .22 | .13 | .19 | .20 | .19 | .19 |
| 27HH | SLH | .30 | .27 | .23 | .24 | .56 | .54 | .25 | .34 |
| 27HH | FRL | .39 | .44 | .21 | .16 | .25 | .22 | .18 | .16 |
| 27HH | FRH | .25 | .49 | .21 | .15 | .23 | .17 | .25 | .25 |
| 27HH | FCL | .32 | .25 | .30 | .24 | .22 | .18 | .23 | .25 |
| 27HH | FCH | .24 | .25 | .22 | .20 | .23 | .19 | .22 | .22 |
| 27HH | FLL | .31 | .30 | .27 | .24 | .20 | .18 | .23 | .25 |
| 27HH | FLH | .23 | .24 | .18 | .20 | .18 | .13 | .19 | .19 |
| 28HL | SRL | .65 | .62 | .55 | .43 | .31 | .29 | .25 | .33 |
| 28HL | SRH | 1.03 | .44 | .71 | .39 | .29 | .25 | .20 | .21 |
| 28HL | SCL | .66 | .44 | .33 | .47 | .23 | .65 | .55 | .40 |
| 28HL | SCH | .39 | .92 | .61 | .46 | .70 | .46 | .59 | .72 |
| 28HL | SLL | .38 | .32 | .57 | .41 | .60 | .80 | .61 | .87 |
| 28HL | SLH | .28 | .44 | .32 | .31 | .64 | .30 | .53 | .71 |
| 28HL | FRL | .16 | .79 | .75 | .24 | .20 | .37 | .19 | .28 |
| 28HL | FRH | .40 | .39 | .83 | .56 | .20 | .25 | .29 | .19 |
| 28HL | FCL | .42 | .62 | .49 | .34 | .28 | .39 | .60 | .81 |

## RAW SCORES--REACTION TIME (CONT'D)

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 28HL | FCH | .35 | .32 | .52 | .45 | .70 | .58 | .27 | .40 |
| 28HL | FLL | .22 | .34 | .36 | .60 | .69 | .69 | .60 | .50 |
| 28HL | FLH | .30 | .40 | .43 | .32 | .25 | .81 | .61 | .34 |
| 29HL | SRL | .64 | .72 | .72 | .70 | .66 | .84 | .57 | .78 |
| 29HL | SRH | .88 | .82 | .78 | .75 | .72 | .55 | .91 | .82 |
| 29HL | SCL | .55 | .66 | .65 | .69 | .65 | .56 | .70 | .73 |
| 29HL | SCH | .39 | .62 | .71 | .69 | .67 | .60 | .55 | .70 |
| 29HL | SLL | .46 | .52 | .49 | .31 | .42 | .41 | .35 | .40 |
| 29HL | SLH | .32 | .98 | .54 | .46 | .52 | .33 | .50 | .48 |
| 29HL | FRL | 1.00 | .75 | .71 | .72 | .69 | .68 | .77 | .66 |
| 29HL | FRH | .78 | 1.09 | .95 | .65 | .81 | .68 | .49 | .83 |
| 29HL | FCL | .67 | .60 | .62 | .57 | .60 | .53 | .50 | .50 |
| 29HL | FCH | .50 | .53 | .58 | .56 | .60 | .54 | .62 | .52 |
| 29HL | FLL | .49 | .37 | .36 | .43 | .30 | .36 | .35 | .31 |
| 29HL | FLH | .40 | .44 | .56 | .40 | .42 | .41 | .38 | .50 |
| 30HL | SRL | 1.04 | 1.19 | .82 | .68 | .85 | .68 | .72 | .82 |
| 30HL | SRH | .65 | 1.00 | .68 | .38 | .65 | .27 | .86 | .67 |
| 30HL | SCL | .44 | .86 | .70 | .46 | .27 | .28 | .22 | .28 |
| 30HL | SCH | .91 | .51 | .51 | .28 | .21 | .25 | .31 | .43 |
| 30HL | SLL | .90 | .28 | .35 | .38 | .25 | .16 | .22 | .22 |
| 30HL | SLH | .38 | .44 | .91 | .35 | .23 | .27 | .24 | .23 |
| 30HL | FRL | .85 | .62 | .76 | .64 | .67 | .72 | .36 | .35 |
| 30HL | FRH | .91 | .92 | .52 | .59 | .74 | .44 | .33 | .29 |
| 30HL | FCL | 1.03 | .41 | .55 | .32 | .29 | .24 | .23 | .20 |
| 30HL | FCH | .58 | .53 | .30 | .30 | .22 | .35 | .27 | .25 |
| 30HL | FLL | .33 | .42 | .35 | .24 | .29 | .22 | .24 | .22 |
| 30HL | FLH | .30 | .28 | .37 | .33 | .20 | .25 | .27 | .25 |
| 31HL | SRL | .39 | .34 | .25 | .26 | .27 | .25 | .25 | .26 |
| 31HL | SRH | .48 | .46 | .49 | .43 | .23 | .23 | .26 | .24 |
| 31HL | SCL | .35 | .59 | .68 | .36 | .25 | .20 | .12 | .23 |
| 31HL | SCH | .80 | .43 | .43 | .65 | .26 | .26 | .28 | .18 |
| 31HL | SLL | .78 | .73 | .72 | .54 | .45 | .55 | .58 | .62 |
| 31HL | SLH | .75 | .47 | .80 | .30 | .54 | .64 | .40 | .45 |
| 31HL | FRL | .28 | .39 | .35 | .35 | .24 | .20 | .25 | .20 |
| 31HL | FRH | .30 | .42 | .34 | .25 | .21 | .28 | .21 | .20 |
| 31HL | FCL | .57 | .73 | .67 | .29 | .26 | .23 | .25 | .31 |
| 31HL | FCH | .46 | .40 | .35 | .29 | .39 | .25 | .32 | .21 |
| 31HL | FLL | .53 | .65 | .51 | .29 | .24 | .43 | .35 | .44 |
| 31HL | FLH | .42 | .23 | .25 | .24 | .35 | 43 | .26 | .44 |
| 32HL | SRL | .94 | .78 | .79 | .56 | .73 | .58 | .71 | .74 |
| 32HL | SRH | 1.19 | .75 | .81 | .52 | .69 | .48 | .62 | .45 |
| 32HL | SCL | .62 | .39 | .44 | .29 | .53 | .38 | .44 | .45 |
| 32HL | SCH | .58 | .59 | .52 | .82 | .47 | .51 | .26 | .42 |
| 32HL | SLL | .36 | .34 | .52 | .36 | .25 | .30 | .38 | .21 |
| 32HL | SLH | .67 | .38 | .37 | .33 | .34 | .24 | .30 | .41 |
| 32HL | FRL | .83 | .67 | .60 | .64 | .61 | .73 | .46 | .56 |
| 32HL | FRH | .60 | .51 | .97 | .54 | .35 | .56 | .43 | .38 |
| 32HL | FCL | .37 | .44 | .41 | .49 | .40 | .31 | .29 | .52 |
| 32HL | FCH | .33 | .49 | .47 | .44 | .44 | .45 | .44 | .47 |

## RAW SCORES--REACTION TIMES (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 32HL | FLL | .31 | .39 | .33 | .34 | .36 | .30 | .30 | .28 |
| 32HL | FLH | .39 | .32 | .30 | .38 | .30 | .27 | .20 | .25 |
| 33HL | SRL | .52 | .54 | .62 | .53 | .47 | .50 | .61 | .66 |
| 33HL | SRH | .27 | .32 | .45 | .49 | .56 | .62 | .55 | .66 |
| 33HL | SCL | .26 | .47 | .29 | .44 | .49 | .46 | .63 | .51 |
| 33HL | SCH | .70 | .64 | .42 | .52 | .43 | .51 | .54 | .37 |
| 33HL | SLL | .44 | .52 | .28 | .37 | .29 | .32 | .37 | .37 |
| 33HL | SLH | .47 | .34 | .43 | .33 | .30 | .43 | .34 | .39 |
| 33HL | FRL | .44 | .64 | .59 | .60 | .59 | .63 | .53 | .59 |
| 33HL | FRH | .29 | .70 | .40 | .54 | .60 | .62 | .55 | .60 |
| 33HL | FCL | .57 | .30 | .48 | .47 | .43 | .50 | .59 | .52 |
| 33HL | FCH | .64 | .54 | .65 | .60 | .64 | .60 | .50 | .65 |
| 33HL | FLL | .27 | .31 | .27 | .32 | .36 | .41 | .23 | .37 |
| 33HL | FLH | .32 | .28 | .41 | .40 | .37 | .48 | .52 | .50 |
| 34HL | SRL | .83 | .37 | .74 | .97 | .79 | .86 | .79 | .58 |
| 34HL | SRH | .87 | .80 | .94 | .83 | .71 | .75 | .75 | .74 |
| 34HL | SCL | .77 | .79 | .51 | .60 | .64 | .69 | .60 | .55 |
| 34HL | SCH | .31 | 1.10 | .59 | .62 | .77 | .70 | .77 | .63 |
| 34HL | SLL | .36 | .46 | .41 | .37 | .43 | .41 | .39 | .47 |
| 34HL | SLH | .26 | .59 | .89 | .83 | .75 | .67 | .82 | .57 |
| 34HL | FRL | .89 | .92 | .99 | .73 | .69 | .69 | .80 | .71 |
| 34HL | FRH | .90 | .86 | .97 | .86 | .80 | .56 | .85 | .54 |
| 34HL | FCL | .95 | .68 | .67 | .58 | .75 | .61 | .61 | .74 |
| 34HL | FCH | .32 | .41 | 1.04 | .63 | .39 | .77 | .47 | .64 |
| 34HL | FLL | .27 | .37 | .46 | .49 | .44 | .36 | .54 | .45 |
| 34HL | FLH | .40 | .26 | .48 | .45 | .71 | .42 | .49 | .93 |
| 35HL | SRL | .86 | .61 | .71 | .85 | .86 | .82 | .55 | .42 |
| 35HL | SRH | .64 | .87 | .90 | .87 | .24 | .71 | .60 | .29 |
| 35HL | SCL | .81 | .72 | .61 | .68 | .63 | .56 | .53 | .48 |
| 35HL | SCH | .90 | .48 | .67 | .32 | .27 | .56 | .49 | .76 |
| 35HL | SLL | .60 | .57 | .42 | .42 | .23 | .43 | .36 | .42 |
| 35HL | SLH | .42 | .56 | .35 | .35 | .22 | .26 | .31 | .31 |
| 35HL | FRL | .65 | .79 | .77 | .53 | .72 | .77 | .33 | .64 |
| 35HL | FRH | .43 | .60 | .79 | .54 | .28 | .80 | .46 | .39 |
| 35HL | FCL | .41 | .74 | .47 | .57 | .37 | .31 | .48 | .41 |
| 35HL | FCH | .61 | .47 | .60 | .48 | .44 | .37 | .43 | .36 |
| 35HL | FLL | .37 | .44 | .41 | .34 | .33 | .24 | .31 | .30 |
| 35HL | FLH | .28 | .37 | .51 | .40 | .37 | .37 | .35 | .33 |
| 36HL | SRL | .94 | .90 | .65 | .78 | .57 | .94 | .82 | .85 |
| 36HL | SRH | .88 | .69 | .61 | .63 | .73 | .71 | .51 | .75 |
| 36HL | SCL | .51 | .28 | .48 | .51 | .68 | .54 | .59 | .73 |
| 36HL | SCH | .60 | .53 | .96 | .80 | .27 | .63 | .52 | .50 |
| 36HL | SLL | .33 | .30 | .31 | .36 | .34 | .30 | .34 | .33 |
| 36HL | SLH | .43 | .37 | .26 | .40 | .74 | .38 | .40 | .44 |
| 36HL | FRL | .93 | .95 | .84 | .86 | .92 | .62 | .93 | .65 |
| 36HL | FRH | .95 | .69 | .64 | .72 | .49 | .44 | .91 | .70 |
| 36HL | FCL | .39 | .46 | .40 | .45 | .38 | .71 | .60 | .29 |
| 36HL | FCH | .46 | .27 | .24 | .31 | .58 | .41 | .99 | .45 |

## RAW SCORES--REACTION TIME (CONT'D)

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 36HL | FLL | .28 | .36 | .25 | .29 | .37 | .54 | .49 | .39 |
| 36HL | FLH | .31 | .43 | .20 | .21 | .29 | .29 | .32 | .27 |
| 37CH | SRL | .27 | .61 | .58 | .48 | .83 | .47 | .26 | .27 |
| 37CH | SRH | .50 | .25 | .29 | .32 | .29 | .33 | .26 | .28 |
| 37CH | SCL | .48 | .20 | .24 | .36 | .27 | .37 | .38 | .63 |
| 37CH | SCH | .38 | .57 | .22 | .61 | .43 | .60 | .43 | .42 |
| 37CH | SLL | .28 | .27 | .24 | .25 | .29 | .27 | .27 | .19 |
| 37CH | SLH | .30 | .24 | .29 | .26 | .25 | .25 | .21 | .26 |
| 37CH | FRL | .23 | .26 | .23 | .24 | .20 | .24 | .26 | .26 |
| 37CH | FRH | .27 | .24 | .25 | .25 | .23 | .24 | .27 | .19 |
| 37CH | FCL | .32 | .32 | .27 | .26 | .23 | .27 | .21 | .25 |
| 37CH | FCH | .34 | .34 | .40 | .31 | .27 | .32 | .28 | .24 |
| 37CH | FLL | .27 | .29 | .27 | .26 | .27 | .27 | .28 | .22 |
| 37CH | FLH | .30 | .22 | .24 | .23 | .22 | .25 | .19 | .27 |
| 38CH | SRL | .28 | .84 | .78 | .70 | .76 | .68 | .70 | .81 |
| 38CH | SRH | .67 | .69 | .86 | .79 | .85 | .78 | .87 | .84 |
| 38CH | SCL | .50 | .40 | .44 | .51 | .55 | .53 | .59 | .67 |
| 38CH | SCH | .56 | .57 | .50 | .55 | .55 | .54 | .67 | .45 |
| 38CH | SLL | .25 | .20 | .24 | .27 | .28 | .26 | .27 | .21 |
| 38CH | SLH | .27 | .28 | .23 | .23 | .23 | .27 | .23 | .22 |
| 38CH | FRL | .77 | .47 | .48 | .48 | .35 | .52 | .44 | .46 |
| 38CH | FRH | .73 | .45 | .43 | .46 | .33 | .43 | .33 | .45 |
| 38CH | FCL | .33 | .43 | .35 | .34 | .36 | .41 | .33 | .38 |
| 38CH | FCH | .32 | .36 | .30 | .27 | .26 | .32 | .26 | .28 |
| 38CH | FLL | .26 | .21 | .33 | .25 | .32 | .28 | .27 | .20 |
| 38CH | FLH | .58 | .25 | .24 | .25 | .20 | .35 | .23 | .27 |
| 39CH | SRL | .25 | .46 | .67 | .42 | .38 | .39 | .45 | .38 |
| 39CH | SRH | .43 | .47 | .35 | .43 | .41 | .41 | .38 | .32 |
| 39CH | SCL | .37 | .33 | .34 | .39 | .33 | .29 | .36 | .31 |
| 39CH | SCH | .32 | .41 | .42 | .38 | .35 | .27 | .38 | .33 |
| 39CH | SLL | .28 | .36 | .30 | .29 | .33 | .33 | .34 | .31 |
| 39CH | SLH | .32 | .26 | .34 | .23 | .30 | .27 | .29 | .26 |
| 39CH | FRL | .62 | .33 | .37 | .27 | .32 | .33 | .29 | .27 |
| 39CH | FRH | .45 | .29 | .45 | .31 | .38 | .32 | .33 | .35 |
| 39CH | FCL | .33 | .27 | .42 | .33 | .36 | .24 | .29 | .26 |
| 39CH | FCH | .36 | .34 | .31 | .33 | .29 | .24 | .27 | .26 |
| 39CH | FLL | .22 | .25 | .31 | .26 | .26 | .27 | .27 | .25 |
| 39CH | FLH | .30 | .32 | .27 | .28 | .29 | .25 | .27 | .27 |
| 40CH | SRL | .73 | .70 | .63 | .65 | .63 | .50 | .56 | .61 |
| 40CH | SRH | .34 | .67 | .73 | .42 | .51 | .59 | .49 | .43 |
| 40CH | SCL | .24 | .24 | .34 | .30 | .26 | .27 | .27 | .29 |
| 40CH | SCH | .35 | .25 | .34 | .31 | .32 | .30 | .27 | .25 |
| 40CH | SLL | .28 | .31 | .25 | .28 | .26 | .25 | .25 | .21 |
| 40CH | SLH | .42 | .27 | .26 | .26 | .28 | .25 | .36 | .42 |
| 40CH | FRL | .34 | .54 | .50 | .40 | .46 | .34 | .35 | .34 |
| 40CH | FRH | .26 | .40 | .43 | .32 | .36 | .26 | .27 | .30 |
| 40CH | FCL | .34 | .31 | .25 | .28 | .27 | .25 | .28 | .32 |
| 40CH | FCH | .40 | .29 | .26 | .30 | .30 | .31 | .32 | .32 |

## RAW SCORES--REACTION TIME (CONT'D)

| SUB-<br>JECT<br>ID | CONDI-<br>TION | TRIALS<br>1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 40CH | FLL | .36 | .26 | .20 | .27 | .29 | .25 | .25 | .25 |
| 40CH | FLH | .29 | .28 | .27 | .27 | .25 | .23 | .24 | .24 |
| 41CH | SRL | .53 | .38 | .36 | .35 | .36 | .32 | .39 | .31 |
| 41CH | SRH | .29 | .25 | .22 | .30 | .39 | .29 | .29 | .28 |
| 41CH | SCL | .22 | .48 | .46 | .36 | .25 | .24 | .22 | .30 |
| 41CH | SCH | .43 | .45 | .25 | .25 | .25 | .24 | .23 | .25 |
| 41CH | SLL | .29 | .30 | .29 | .25 | .22 | .27 | .28 | .21 |
| 41CH | SLH | .55 | .23 | .27 | .28 | .28 | .26 | .25 | .24 |
| 41CH | FRL | .29 | .32 | .29 | .26 | .21 | .22 | .22 | .23 |
| 41CH | FRH | .30 | .20 | .21 | .22 | .23 | .27 | .29 | .20 |
| 41CH | FCL | .25 | .23 | .32 | .30 | .25 | .25 | .27 | .28 |
| 41CH | FCH | .22 | .23 | .28 | .25 | .23 | .26 | .29 | .27 |
| 41CH | FLL | .24 | .21 | .26 | .25 | .25 | .25 | .26 | .28 |
| 41CH | FLH | .29 | .32 | .22 | .25 | .24 | .24 | .26 | .22 |
| 42CH | SRL | .58 | .57 | .64 | .67 | .59 | .60 | .61 | .58 |
| 42CH | SRH | .51 | .50 | .52 | .52 | .53 | .55 | .56 | .54 |
| 42CH | SCL | .52 | .42 | .50 | .47 | .46 | .47 | .40 | .54 |
| 42CH | SCH | .43 | .48 | .51 | .50 | .49 | .43 | .44 | .52 |
| 42CH | SLL | .32 | .39 | .25 | .28 | .31 | .33 | .39 | .42 |
| 42CH | SLH | .38 | .38 | .36 | .38 | .38 | .46 | .49 | .52 |
| 42CH | FRL | .47 | .40 | .37 | .40 | .47 | .43 | .41 | .44 |
| 42CH | FRH | .26 | .45 | .35 | .36 | .38 | .39 | .39 | .30 |
| 42CH | FCL | .49 | .38 | .40 | .47 | .54 | .54 | .53 | .32 |
| 42CH | FCH | .43 | .40 | .45 | .38 | .37 | .39 | .41 | .42 |
| 42CH | FLL | .35 | .35 | .27 | .30 | .33 | .30 | .29 | .28 |
| 42CH | FLH | .37 | .29 | .35 | .32 | .33 | .30 | .24 | .30 |
| 43CH | SRL | .33 | .30 | .28 | .26 | .27 | .22 | .22 | .24 |
| 43CH | SRH | .40 | .37 | .31 | .29 | .22 | .26 | .21 | .15 |
| 43CH | SCL | .34 | .36 | .40 | .42 | .30 | .26 | .28 | .30 |
| 43CH | SCH | .30 | .36 | .44 | .32 | .21 | .36 | .27 | .20 |
| 43CH | SLL | .65 | .61 | .55 | .35 | .52 | .30 | .28 | .28 |
| 43CH | SLH | .45 | .45 | .46 | .32 | .18 | .31 | .29 | .29 |
| 43CH | FRL | .31 | .31 | .31 | .25 | .26 | .19 | .21 | .25 |
| 43CH | FRH | .30 | .32 | .31 | .33 | .26 | .23 | .25 | .26 |
| 43CH | FCL | .42 | .38 | .33 | .55 | .29 | .32 | .25 | .21 |
| 43CH | FCH | .33 | .28 | .26 | .26 | .25 | .20 | .25 | .21 |
| 43CH | FLL | .37 | .35 | .32 | .25 | .25 | .41 | .33 | .18 |
| 43CH | FLH | .42 | .43 | .46 | .30 | .26 | .28 | .27 | .21 |
| 44CH | SRL | .40 | .36 | .30 | .26 | .20 | .14 | .28 | .22 |
| 44CH | SRH | .41 | .34 | .20 | .22 | .32 | .20 | .18 | .22 |
| 44CH | SCL | .30 | .33 | .21 | .27 | .33 | .21 | .31 | .45 |
| 44CH | SCH | .36 | .38 | .37 | .25 | .22 | .29 | .28 | .25 |
| 44CH | SLL | .30 | .31 | .31 | .33 | .36 | .31 | .32 | .29 |
| 44CH | SLH | .38 | .39 | .26 | .25 | .23 | .36 | .24 | .28 |
| 44CH | FRL | .27 | .22 | .21 | .23 | .27 | .21 | .25 | .21 |
| 44CH | FRH | .28 | .25 | .31 | .23 | .1[illegible] | .28 | .20 | .25 |
| 44CH | FCL | .30 | .27 | .32 | .35 | .33 | .26 | .31 | .14 |
| 44CH | FCH | .35 | .36 | .23 | .24 | .22 | .18 | .13 | .20 |
| 44CH | FLL | .37 | .46 | .13 | .25 | .25 | .25 | .18 | .19 |

## RAW SCORES--REACTION TIME (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 44CH | FLH | .22 | .20 | .18 | .21 | .23 | .24 | .28 | .25 |
| 45CH | SRL | .22 | .20 | .24 | .22 | .19 | .17 | .22 | .22 |
| 45CH | SRH | .33 | .22 | .25 | .25 | .24 | .22 | .20 | .27 |
| 45CH | SCL | .26 | .23 | .24 | .24 | .25 | .20 | .29 | .33 |
| 45CH | SCH | .19 | .15 | .28 | .27 | .25 | .25 | .20 | .23 |
| 45CH | SLL | .53 | .65 | .30 | .36 | .41 | .57 | .35 | .32 |
| 45CH | SLH | .20 | .24 | .21 | .25 | .23 | .21 | .23 | .41 |
| 45CH | FRL | .23 | .33 | .22 | .24 | .23 | .21 | .27 | .31 |
| 45CH | FRH | .23 | .28 | .27 | .25 | .23 | .21 | .26 | .28 |
| 45CH | FCL | .37 | .21 | .22 | .22 | .23 | .24 | .27 | .26 |
| 45CH | FCH | .27 | .27 | .27 | .26 | .27 | .26 | .22 | .29 |
| 45CH | FLL | .18 | .19 | .21 | .23 | .26 | .26 | .33 | .33 |
| 45CH | FLH | .29 | .22 | .29 | .27 | .27 | .25 | .33 | .27 |
| 46CL | SRL | .75 | .64 | .95 | .83 | .77 | .87 | .67 | .72 |
| 46CL | SRH | .79 | .53 | .77 | .69 | .61 | .58 | .67 | .54 |
| 46CL | SCL | 1.19 | 1.14 | 1.14 | 1.07 | 1.00 | .91 | 1.20 | .50 |
| 46CL | SCH | .64 | .79 | .72 | .75 | .80 | 1.01 | .65 | .65 |
| 46CL | SLL | .55 | .66 | .58 | .59 | .55 | .55 | .48 | .48 |
| 46CL | SLH | .83 | .54 | .50 | .47 | .43 | .38 | .39 | .30 |
| 46CL | FRL | .84 | .57 | .59 | .57 | .55 | .58 | .60 | .47 |
| 46CL | FRH | .69 | .53 | .60 | .62 | .57 | .57 | .68 | .49 |
| 46CL | FCL | .79 | .94 | .60 | .63 | .70 | .77 | .71 | .60 |
| 46CL | FCH | .97 | .62 | .60 | .61 | .56 | .52 | .40 | .41 |
| 46CL | FLL | .81 | .86 | .45 | .41 | .38 | .37 | .32 | .42 |
| 46CL | FLH | .75 | .78 | .34 | .40 | .46 | .54 | .48 | .47 |
| 47CL | SRL | .31 | .38 | .30 | .30 | .29 | .32 | .30 | .27 |
| 47CL | SRH | .29 | .32 | .30 | .32 | .33 | .32 | .35 | .38 |
| 47CL | SCL | .75 | .32 | .57 | .60 | .96 | .58 | .60 | .58 |
| 47CL | SCH | .84 | .50 | .48 | .48 | .46 | .44 | .45 | .47 |
| 47CL | SLL | .65 | .25 | .57 | .55 | .54 | .74 | .82 | .91 |
| 47CL | SLH | .25 | .25 | .24 | .26 | .83 | .33 | .31 | .29 |
| 47CL | FRL | .36 | .29 | .34 | .31 | .30 | .44 | .42 | .41 |
| 47CL | FRH | .32 | .35 | .39 | .39 | .36 | .29 | .21 | .21 |
| 47CL | FCL | .43 | .26 | .23 | .30 | .81 | .38 | .36 | .32 |
| 47CL | FCH | .51 | .35 | .39 | .39 | .37 | .34 | .39 | .41 |
| 47CL | FLL | .43 | .73 | .78 | .35 | .24 | .25 | .29 | .29 |
| 47CL | FLH | .25 | .23 | .27 | .40 | .72 | .20 | .22 | .19 |
| 48CL | SRL | .28 | .27 | .27 | .27 | .28 | .30 | .30 | .22 |
| 48CL | SRH | .24 | .25 | .25 | .23 | .30 | .30 | .29 | .27 |
| 48CL | SCL | .21 | .22 | .36 | .62 | .39 | .37 | .34 | .51 |
| 48CL | SCH | .65 | .43 | .44 | .44 | .20 | .23 | .27 | .39 |
| 48CL | SLL | .50 | .22 | .41 | .76 | .33 | .29 | .27 | .18 |
| 48CL | SLH | .19 | .35 | .28 | .25 | .16 | .19 | .24 | .75 |
| 48CL | FRL | .36 | .27 | .29 | .29 | .31 | .30 | .21 | .25 |
| 48CL | FRH | .27 | .24 | .30 | .34 | .35 | .30 | .21 | .27 |
| 48CL | FCL | .25 | .52 | .40 | .33 | .40 | .37 | .33 | .42 |
| 48CL | FCH | .47 | .36 | .30 | .24 | .34 | .35 | .33 | .24 |
| 48CL | FLL | .20 | .31 | .28 | .24 | .26 | .27 | .25 | .22 |

## RAW SCORES--REACTION TIME (CONT'D)

| SUBJECT ID | CONDITION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 48CL | FLH | .35 | .31 | .31 | .35 | .28 | .28 | .26 | .23 |
| 49CL | SRL | .82 | 1.02 | .84 | .69 | 1.03 | .71 | .78 | .82 |
| 49CL | SRH | .61 | .63 | .69 | .60 | .91 | .67 | .69 | .65 |
| 49CL | SCL | .71 | .64 | .61 | .78 | .83 | .89 | .81 | .77 |
| 49CL | SCH | 1.01 | .74 | .81 | .92 | .86 | .83 | .85 | .86 |
| 49CL | SLL | .58 | .99 | .60 | .62 | .66 | .54 | .67 | .58 |
| 49CL | SLH | .67 | .77 | .67 | .56 | .53 | .69 | .61 | .71 |
| 49CL | FRL | .82 | .77 | .88 | .67 | .62 | .59 | .63 | .64 |
| 49CL | FRH | .49 | .68 | .60 | .66 | .68 | .76 | .72 | .70 |
| 49CL | FCL | .84 | .65 | .62 | .62 | .97 | .52 | .68 | .77 |
| 49CL | FCH | .50 | .96 | .46 | .49 | .69 | .75 | .51 | .52 |
| 49CL | FLL | .42 | .50 | .41 | .49 | .48 | .56 | .49 | .53 |
| 49CL | FLH | .35 | .41 | .52 | .47 | .48 | .47 | .50 | .49 |
| 50CL | SRL | .63 | .54 | .63 | .50 | .47 | .43 | .46 | .42 |
| 50CL | SRH | .68 | .58 | .58 | .31 | .63 | .58 | .55 | .60 |
| 50CL | SCL | .56 | .31 | .41 | .54 | .32 | .53 | .57 | .60 |
| 50CL | SCH | .46 | .37 | .37 | .50 | .32 | .41 | .38 | .47 |
| 50CL | SLL | .36 | .25 | .25 | .26 | .16 | .31 | .30 | .27 |
| 50CL | SLH | .23 | .34 | .26 | .24 | .25 | .18 | .26 | .25 |
| 50CL | FRL | .53 | .61 | .32 | .35 | .37 | .34 | .38 | .38 |
| 50CL | FRH | .65 | .61 | .65 | .23 | .27 | .27 | .30 | .30 |
| 50CL | FCL | .20 | .18 | .25 | .35 | .26 | .20 | .28 | .27 |
| 50CL | FCH | .29 | .27 | .22 | .24 | .28 | .26 | .27 | .29 |
| 50CL | FLL | .22 | .21 | .21 | .23 | .26 | .30 | .30 | .29 |
| 50CL | FLH | .31 | .20 | .21 | .29 | .20 | .25 | .25 | .25 |
| 51CL | SRL | .84 | .35 | .32 | .76 | .31 | .72 | .36 | .39 |
| 51CL | SRH | .53 | .52 | .78 | .68 | .47 | .52 | .50 | .57 |
| 51CL | SCL | .59 | .39 | .46 | .40 | .39 | .44 | .46 | .42 |
| 51CL | SCH | .56 | .44 | .46 | .60 | .70 | .64 | .66 | .65 |
| 51CL | SLL | .52 | .68 | .59 | .66 | .65 | .54 | .60 | .63 |
| 51CL | SLH | .78 | .40 | .26 | .28 | .34 | .24 | .27 | .25 |
| 51CL | FRL | .82 | .41 | .50 | .89 | .51 | .62 | .70 | .63 |
| 51CL | FRH | .87 | .78 | .68 | .67 | .52 | .56 | .56 | .60 |
| 51CL | FCL | .92 | .75 | .63 | .61 | .42 | .68 | .73 | .69 |
| 51CL | FCH | .67 | .63 | .43 | .79 | .36 | .39 | .67 | .64 |
| 51CL | FLL | .43 | .91 | .72 | .24 | .31 | .31 | .36 | .35 |
| 51CL | FLH | .34 | .50 | .31 | .33 | .33 | .33 | .34 | .33 |
| 52CL | SRL | .64 | .69 | .74 | .70 | .67 | .63 | .66 | .64 |
| 52CL | SRH | .98 | .73 | .86 | .65 | .59 | .65 | .65 | .68 |
| 52CL | SCL | .85 | .51 | .61 | .47 | .52 | .53 | .59 | .56 |
| 52CL | SCH | .74 | .52 | .58 | .62 | .63 | .73 | .71 | .70 |
| 52CL | SLL | .27 | .27 | .34 | .26 | .33 | .39 | .36 | .35 |
| 52CL | SLH | .27 | .32 | .37 | .34 | .35 | .80 | .37 | .37 |
| 52CL | FRL | .64 | .73 | .69 | .68 | .65 | .62 | .66 | .64 |
| 52CL | FRH | .74 | .76 | .65 | .65 | .62 | .68 | .68 | .66 |
| 52CL | FCL | .44 | .33 | .47 | .51 | .55 | .98 | .52 | .51 |
| 52CL | FCH | .37 | .28 | .50 | .42 | .54 | .51 | .51 | .50 |
| 52CL | FLL | .48 | .27 | .31 | .30 | .47 | .40 | .43 | .41 |

## RAW SCORES--REACTION TIME (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 52CL | FLH | .36 | .36 | .35 | .37 | .36 | .37 | .36 | .35 |
| 53CL | SRL | .36 | .30 | .28 | .25 | .31 | .33 | .35 | .27 |
| 53CL | SRH | .42 | .49 | .47 | .41 | .24 | .30 | .31 | .42 |
| 53CL | SCL | .67 | .64 | .61 | .61 | .47 | .46 | .48 | .42 |
| 53CL | SCH | .88 | .72 | .66 | .65 | .53 | .60 | .60 | .63 |
| 53CL | SLL | .82 | .72 | .70 | .70 | .35 | .35 | .36 | .38 |
| 53CL | SLH | .66 | .85 | .85 | .84 | .83 | .85 | .84 | .80 |
| 53CL | FRL | .43 | .38 | .37 | .31 | .34 | .36 | .34 | .30 |
| 53CL | FRH | .26 | .40 | .33 | .26 | .39 | .34 | .28 | .26 |
| 53CL | FCL | .45 | .64 | .59 | .59 | .42 | .58 | .39 | .59 |
| 53CL | FCH | .78 | .57 | .56 | .53 | .38 | .52 | .50 | .34 |
| 53CL | FLL | .80 | .82 | .26 | .22 | .27 | .27 | .22 | .24 |
| 53CL | FLH | .70 | .25 | .29 | .26 | .24 | .29 | .62 | .23 |
| 54CL | SRL | .35 | .84 | .79 | .68 | .80 | .78 | .62 | .53 |
| 54CL | SRH | .69 | .79 | .70 | .68 | .77 | .73 | .69 | .62 |
| 54CL | SCL | .45 | .23 | .26 | .27 | .53 | .25 | .42 | .27 |
| 54CL | SCH | .62 | .64 | .64 | .64 | .62 | .62 | .63 | .50 |
| 54CL | SLL | .33 | .31 | .28 | .23 | .29 | .28 | .29 | .29 |
| 54CL | SLH | .35 | .33 | .36 | .38 | .37 | .29 | .25 | .23 |
| 54CL | FRL | .87 | .74 | .66 | .48 | .76 | .73 | .66 | .76 |
| 54CL | FRH | .90 | .25 | .29 | .28 | .21 | .33 | .35 | .27 |
| 54CL | FCL | .44 | .38 | .37 | .36 | .26 | .38 | .42 | .27 |
| 54CL | FCH | .47 | .41 | .42 | .45 | .30 | .41 | .49 | .35 |
| 54CL | FLL | .33 | .28 | .28 | .29 | .30 | .30 | .30 | .23 |
| 54CL | FLH | .29 | .34 | .36 | .37 | .30 | .29 | .29 | .25 |

## RAW SCORES--MOVEMENT TIME

| SUB-JECT ID | CONDI-TION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 01JH | SRL | .71 | .92 | 1.10 | 1.04 | 1.80 | 1.53 | 1.37 | 1.37 |
| 01JH | SRH | .90 | 1.15 | 1.50 | 1.53 | 1.26 | 1.54 | 1.63 | 1.26 |
| 01JH | SCL | 1.21 | 1.27 | 1.28 | 1.80 | 1.44 | 1.37 | 1.58 | 1.42 |
| 01JH | SCH | 1.10 | 1.20 | 1.32 | 1.40 | 1.72 | 1.36 | 1.49 | 1.37 |
| 01JH | SLL | 1.53 | 1.64 | 1.50 | .97 | 1.27 | 1.19 | 1.48 | 1.37 |
| 01JH | SLH | 1.92 | 1.36 | 1.74 | 1.36 | 1.31 | 1.24 | 1.24 | 1.36 |
| 01JH | FRL | 1.37 | 1.28 | 1.54 | 1.24 | 1.35 | 1.75 | 1.80 | 1.35 |
| 01JH | FRH | 1.64 | 2.00 | 2.03 | 1.71 | 1.89 | 2.40 | 2.12 | 1.89 |
| 01JH | FCL | 1.67 | 1.96 | 1.85 | 1.59 | 1.75 | 1.27 | 1.66 | 1.67 |
| 01JH | FCH | 2.15 | 1.86 | 1.98 | 1.74 | 1.94 | 2.00 | 1.79 | 1.79 |
| 01JH | FLL | 1.91 | 1.95 | 1.83 | 1.74 | 1.70 | 1.49 | 1.45 | 1.74 |
| 01JH | FLH | 1.95 | 1.92 | 1.75 | 1.50 | 1.48 | 1.83 | 1.57 | 1.83 |
| 02JH | SRL | 1.47 | 1.36 | 1.19 | 1.27 | 1.17 | 1.25 | 1.15 | 1.25 |
| 02JH | SRH | 1.36 | 1.36 | 1.38 | 1.33 | 1.27 | 1.25 | 1.32 | 1.32 |
| 02JH | SCL | 1.15 | 1.43 | 1.24 | 1.18 | 1.19 | 1.17 | 1.07 | 1.17 |
| 02JH | SCH | 1.37 | 1.51 | 1.15 | 1.26 | 1.28 | 1.14 | 1.17 | 1.15 |
| 02JH | SLL | 1.25 | 1.37 | 1.47 | 1.37 | 1.25 | 1.35 | 1.21 | 1.25 |
| 02JH | SLH | 1.46 | 1.45 | 1.40 | 1.44 | 1.15 | 1.47 | 1.42 | 1.40 |
| 02JH | FRL | 1.55 | 1.51 | 1.41 | 1.22 | 1.45 | 1.47 | 1.42 | 1.45 |
| 02JH | FRH | 1.38 | 1.83 | 1.78 | 1.37 | 1.32 | 1.62 | 1.65 | 1.62 |
| 02JH | FCL | 1.56 | 1.35 | 1.36 | 1.18 | 1.36 | 1.32 | 1.60 | 1.39 |
| 02JH | FCH | 1.75 | 2.00 | 1.68 | 1.75 | 1.53 | 1.50 | 1.62 | 1.69 |
| 02JH | FLL | 1.14 | 1.51 | 1.56 | 1.33 | 1.55 | 1.50 | 1.70 | 1.51 |
| 02JH | FLH | 1.43 | 1.51 | 1.62 | 1.33 | 1.65 | 1.57 | 1.60 | 1.60 |
| 03JH | SRL | 1.39 | 1.26 | 1.47 | 1.42 | 1.28 | 1.58 | 1.44 | 1.50 |
| 03JH | SRH | 1.13 | 1.15 | 1.52 | 1.27 | 1.13 | 1.30 | 1.23 | 1.[illegible]0 |
| 03JH | SCL | 1.47 | 1.23 | 1.25 | 1.37 | 1.48 | 1.48 | 1.42 | 1.25 |
| 03JH | SCH | 1.07 | 1.12 | 1.03 | 1.21 | 1.28 | 1.26 | 1.54 | 1.18 |
| 03JH | SLL | 1.59 | 1.35 | 1.38 | 1.39 | 1.30 | 1.43 | 1.30 | 1.40 |
| 03JH | SLH | 1.36 | 1.38 | 1.37 | 1.33 | 1.34 | 1.22 | 1.31 | 1.31 |
| 03JH | FRL | 1.22 | 1.15 | 1.55 | 1.25 | 1.32 | 1.10 | 1.29 | 1.11 |
| 03JH | FRH | 1.51 | 1.42 | 1.88 | 1.50 | 1.42 | 1.35 | 1.48 | 1.45 |
| 03JH | FCL | 1.22 | 1.67 | 1.46 | 1.41 | 1.38 | 1.36 | 1.64 | 1.27 |
| 03JH | FCH | 1.38 | 1.83 | 1.73 | 1.53 | 1.40 | 1.63 | 1.56 | 1.23 |
| 03JH | FLL | 1.69 | 1.52 | 1.50 | 1.51 | 1.68 | 1.32 | 1.45 | 1.42 |
| 03JH | FLH | 1.36 | 1.71 | 1.74 | 1.54 | 1.32 | 1.56 | 1.42 | 1.67 |
| 04JH | SRL | 1.21 | 1.11 | 1.06 | 1.21 | 1.46 | 1.47 | 1.57 | 1.56 |
| 04JH | SRH | 1.43 | 1.16 | 1.25 | 1.49 | 1.72 | 1.62 | 1.67 | 1.42 |
| 04JH | SCL | 1.30 | 1.00 | 1.31 | 1.39 | 1.70 | 1.62 | 1.35 | 1.45 |
| 04JH | SCH | 1.00 | .97 | 1.14 | 1.30 | 1.64 | 1.26 | 1.47 | 1.62 |
| 04JH | SLL | 1.65 | 1.50 | 1.22 | 1.52 | 1.58 | 1.55 | 1.64 | 1.50 |
| 04JH | SLH | 1.32 | 1.31 | 1.35 | 1.44 | 1.47 | 1.47 | 1.52 | 1.62 |
| 04JH | FRL | 1.35 | 1.47 | 1.65 | 1.55 | 1.60 | 1.54 | 1.94 | 1.87 |
| 04JH | FRH | 1.38 | 1.77 | 1.73 | 1.74 | 1.77 | 1.90 | 1.85 | 1.79 |
| 04JH | FCL | 1.39 | 1.27 | 1.62 | 1.57 | 1.60 | 1.68 | 1.74 | 1.75 |
| 04JH | FCH | 1.44 | 1.70 | 1.50 | 1.74 | 1.94 | 1.84 | 1.90 | 1.87 |
| 04JH | FLL | 1.34 | 1.43 | 1.36 | 1.51 | 1.57 | 1.54 | 1.65 | 1.67 |
| 04JH | FLH | 1.34 | 1.62 | 1.38 | 1.56 | 1.62 | 1.67 | 1.66 | 1.66 |

## RAW SCORES--MOVEMENT TIME (CONT'D)

| SUB-JECT ID | CONDI-TION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 05JH | SRL | 1.52 | 1.06 | 1.30 | 1.33 | 1.21 | 1.10 | 1.14 | 1.24 |
| 05JH | SRH | 1.55 | 1.65 | 1.54 | .93 | 1.45 | 1.62 | 1.42 | 1.45 |
| 05JH | SCL | 1.38 | 1.29 | .96 | 1.20 | .83 | 1.28 | 1.10 | 1.15 |
| 05JH | SCH | 1.35 | 1.43 | 1.43 | 1.25 | 1.24 | 1.17 | 1.25 | 1.30 |
| 05JH | SLL | 1.40 | 1.64 | 1.31 | 1.55 | 1.74 | 1.31 | 1.16 | 1.44 |
| 05JH | SLH | 1.46 | 1.72 | 1.25 | 1.28 | 1.32 | 1.36 | 1.25 | 1.37 |
| 05JH | FRL | 1.33 | 1.52 | 1.26 | 1.49 | 1.20 | 1.29 | 1.36 | 1.34 |
| 05JH | FRH | 1.43 | 1.63 | 1.49 | 1.81 | 2.06 | 1.73 | 2.00 | 1.73 |
| 05JH | FCL | 1.63 | 1.54 | 1.56 | 1.52 | 1.74 | 1.35 | 1.45 | 1.54 |
| 05JH | FCH | 1.82 | 1.68 | 1.65 | 1.57 | 1.64 | 1.59 | 1.62 | 1.65 |
| 05JH | FLL | 1.42 | 1.74 | 1.53 | 1.30 | 1.32 | 1.52 | 1.51 | 1.47 |
| 05JH | FLH | 1.36 | 1.68 | 1.74 | 1.54 | 1.40 | 1.51 | 1.55 | 1.54 |
| 06JH | SRL | 1.52 | 1.57 | 1.32 | 1.62 | 1.64 | 1.68 | 1.67 | 1.57 |
| 06JH | SRH | 2.00 | 2.13 | 2.07 | 1.89 | 1.97 | 1.87 | 1.76 | 1.96 |
| 06JH | SCL | 1.75 | 1.73 | 1.75 | 1.63 | 1.67 | 1.83 | 1.78 | 1.73 |
| 06JH | SCH | 1.99 | 1.81 | 1.52 | 1.65 | 1.79 | 1.51 | 1.79 | 1.72 |
| 06JH | SLL | 1.80 | 1.53 | 1.39 | 1.31 | 1.32 | 1.60 | 1.64 | 1.51 |
| 06JH | SLH | 1.96 | 1.40 | 1.57 | 1.57 | 1.53 | 1.70 | 1.52 | 1.59 |
| 06JH | FRL | 1.85 | 1.88 | 1.70 | 1.71 | 1.72 | 1.49 | 1.38 | 1.70 |
| 06JH | FRH | 1.98 | 1.87 | 1.73 | 2.05 | 1.93 | 1.82 | 1.60 | 1.85 |
| 06JH | FCL | 1.88 | 1.90 | 1.92 | 1.57 | 1.57 | 1.43 | 1.59 | 1.59 |
| 06JH | FCH | 1.81 | 2.01 | 1.99 | 1.73 | 1.68 | 1.88 | 1.87 | 1.85 |
| 06JH | FLL | 2.04 | 1.90 | 1.83 | 1.74 | 1.83 | 1.48 | 1.63 | 1.78 |
| 06JH | FLH | 2.16 | 2.02 | 2.02 | 1.69 | 1.78 | 1.85 | 1.94 | 1.91 |
| 07JH | SRL | 1.08 | 1.05 | 1.01 | .79 | .70 | .75 | 1.09 | 1.04 |
| 07JH | SRH | 1.23 | 1.40 | .95 | 1.79 | 1.36 | 1.05 | .90 | .94 |
| 07JH | SCL | .94 | .88 | .98 | 1.17 | .75 | 1.04 | .98 | 1.12 |
| 07JH | SCH | 1.00 | 1.17 | 1.04 | 1.00 | .96 | 1.16 | 1.01 | 1.02 |
| 07JH | SLL | 1.10 | 1.12 | 1.12 | 1.52 | 1.06 | 1.01 | 1.07 | 1.07 |
| 07JH | SLH | 1.40 | 1.53 | 1.34 | 1.40 | 1.30 | 1.37 | 1.30 | 1.07 |
| 07JH | FRL | 1.36 | 1.09 | 1.20 | 1.24 | 1.20 | 1.11 | 1.29 | 1.20 |
| 07JH | FRH | 1.69 | 1.55 | 1.63 | 1.66 | 1.63 | 1.66 | 1.65 | 1.62 |
| 07JH | FCL | 1.52 | 1.27 | 1.43 | 1.39 | 1.29 | 1.33 | 1.63 | 1.61 |
| 07JH | FCH | 1.59 | 1.37 | 1.52 | 1.44 | 1.46 | 1.41 | 1.65 | 1.72 |
| 07JH | FLL | 1.61 | 1.77 | 1.81 | 1.72 | 1.80 | 1.92 | 1.86 | 2.00 |
| 07JH | FLH | 1.93 | 1.72 | 1.70 | 1.76 | 1.62 | 1.53 | 1.58 | 1.76 |
| 08JH | SRL | 1.10 | 1.30 | .97 | .93 | 1.24 | .97 | .99 | .95 |
| 08JH | SRH | .85 | .95 | .94 | .90 | .81 | 1.04 | .92 | 1.03 |
| 08JH | SCL | .78 | .97 | .93 | .93 | .90 | .80 | 1.04 | 1.08 |
| 08JH | SCH | .92 | 1.03 | 1.00 | 1.04 | 1.03 | .91 | 1.07 | 1.03 |
| 08JH | SLL | 1.26 | 1.25 | 1.40 | 1.42 | 1.16 | 1.15 | 1.43 | 1.45 |
| 08JH | SLH | 1.15 | 1.02 | 1.14 | .93 | 1.20 | 1.23 | 1.20 | 1.26 |
| 08JH | FRL | .87 | .69 | .84 | 1.08 | .82 | .71 | .87 | .84 |
| 08JH | FRH | .94 | .70 | .95 | .81 | 1.01 | 1.08 | 1.07 | 1.05 |
| 08JH | FCL | .89 | .76 | .89 | .96 | .93 | .86 | .71 | 1.15 |
| 08JH | FCH | 1.15 | 1.25 | 1.21 | 1.27 | 1.10 | 1.38 | 1.15 | 1.15 |
| 08JH | FLL | 1.20 | 1.30 | 1.30 | 1.22 | 1.38 | 1.34 | 1.36 | 1.33 |
| 08JH | FLH | 1.48 | 1.44 | 1.39 | 1.45 | 1.30 | 1.45 | 1.28 | 1.38 |

## RAW SCORES--MOVEMENT TIME (CONT'D)

| SUB-JECT ID | CONDI-TION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 09JH | SRL | 1.11 | .83 | .91 | 1.25 | 1.40 | 1.15 | 1.20 | 1.35 |
| 09JH | SRH | .94 | .73 | .94 | 1.05 | 1.03 | .96 | 1.05 | 1.01 |
| 09JH | SCL | 1.13 | 1.18 | 1.16 | 1.15 | 1.16 | 1.17 | 1.23 | 1.17 |
| 09JH | SCH | 1.00 | 1.01 | 1.13 | 1.15 | 1.15 | 1.12 | 1.27 | 1.15 |
| 09JH | SLL | 1.50 | 1.40 | 1.42 | 1.46 | 1.50 | 1.47 | 1.56 | 1.45 |
| 09JH | SLH | 1.13 | 1.29 | 1.18 | 1.16 | 1.13 | 1.17 | 1.16 | 1.15 |
| 09JH | FRL | 1.63 | 1.37 | 1.37 | 1.36 | 1.35 | 1.37 | 1.55 | 1.47 |
| 09JH | FRH | 1.32 | 1.58 | 1.53 | 1.59 | 1.65 | 1.55 | 1.64 | 1.54 |
| 09JH | FCL | 1.47 | 1.65 | 1.74 | 1.47 | 1.70 | 1.56 | 1.52 | 1.56 |
| 09JH | FCH | 1.59 | 1.62 | 1.47 | 1.52 | 1.62 | 1.62 | 1.70 | 1.79 |
| 09JH | FLL | 1.78 | 1.48 | 1.75 | 1.71 | 1.76 | 1.70 | 1.67 | 1.69 |
| 09JH | FLH | 1.87 | 1.89 | 1.82 | 1.57 | 1.70 | 1.77 | 1.80 | 1.72 |
| 10JL | SRL | 1.04 | 1.16 | 1.69 | 1.04 | 1.15 | 1.50 | 1.75 | 1.16 |
| 10JL | SRH | 1.17 | .89 | 1.51 | 1.46 | 1.60 | 1.61 | 1.72 | 1.06 |
| 10JL | SCL | .78 | .95 | .87 | .84 | .87 | 1.12 | 1.37 | .97 |
| 10JL | SCH | 1.76 | 1.16 | 1.65 | 1.69 | 1.72 | 1.40 | 1.73 | 1.80 |
| 10JL | SLL | 1.45 | 1.57 | 1.75 | 1.20 | 1.57 | 1.60 | 1.31 | 2.21 |
| 10JL | SLH | 1.58 | 1.32 | 1.38 | 1.80 | 1.52 | 1.50 | 1.58 | 1.72 |
| 10JL | FRL | 1.17 | 1.54 | 1.50 | 1.54 | 1.53 | 1.59 | 1.70 | 2.26 |
| 10JL | FRH | 1.58 | 1.52 | 1.70 | 1.34 | 1.32 | 1.85 | 1.90 | 1.32 |
| 10JL | FCL | 1.35 | 1.39 | 1.34 | 1.40 | 1.37 | 1.54 | 1.14 | 1.28 |
| 10JL | FCH | 1.72 | 1.64 | 1.80 | 1.72 | 1.72 | 2.16 | 1.90 | 2.00 |
| 10JL | FLL | 1.57 | 1.70 | 1.58 | 1.80 | 1.54 | 1.56 | 1.71 | 1.44 |
| 10JL | FLH | 1.60 | 2.01 | 1.31 | 1.62 | 1.60 | 1.63 | 1.89 | 1.78 |
| 11JL | SRL | 1.22 | 1.23 | .83 | 1.21 | 1.65 | 1.29 | 1.10 | 1.45 |
| 11JL | SRH | 1.83 | 1.83 | 1.84 | 1.87 | 1.54 | 1.78 | 1.20 | 1.66 |
| 11JL | SCL | 1.85 | 1.80 | 1.88 | 1.83 | 1.49 | 1.90 | 1.58 | 1.84 |
| 11JL | SCH | 1.02 | 1.06 | 1.04 | 1.04 | 1.50 | 1.19 | 1.10 | 1.05 |
| 11JL | SLL | 1.36 | 1.36 | 1.39 | 1.11 | 1.30 | 1.15 | 1.37 | 1.50 |
| 11JL | SLH | 1.64 | 1.63 | 1.62 | .95 | 1.18 | 1.60 | 1.50 | 1.65 |
| 11JL | FRL | .99 | 1.64 | .81 | 1.67 | 1.96 | 1.65 | 1.66 | 1.59 |
| 11JL | FRH | 1.53 | 1.93 | 1.81 | 1.69 | 1.90 | 1.99 | 1.91 | 1.94 |
| 11JL | FCL | 1.03 | 1.05 | 1.06 | 1.03 | 1.57 | 1.18 | 1.50 | 1.09 |
| 11JL | FCH | .92 | 1.42 | 1.46 | 1.41 | 1.55 | 1.41 | 1.42 | 1.24 |
| 11JL | FLL | 1.57 | 1.39 | 1.47 | 1.54 | 1.37 | 1.37 | 1.29 | 1.50 |
| 11JL | FLH | 1.39 | 1.34 | 1.35 | 1.38 | 1.15 | 1.30 | 1.36 | 1.68 |
| 12JL | SRL | 1.22 | .94 | .85 | .92 | .81 | 1.51 | .80 | 1.10 |
| 12JL | SRH | .98 | .81 | .82 | 1.60 | .95 | 1.50 | 1.39 | .99 |
| 12JL | SCL | .90 | 1.40 | 1.00 | 1.42 | 1.33 | 1.47 | 1.67 | 1.45 |
| 12JL | SCH | 1.18 | .86 | 1.42 | 1.12 | 1.40 | 1.26 | 1.05 | 1.15 |
| 12JL | SLL | 1.44 | 1.46 | 1.59 | 1.90 | 1.70 | 1.82 | 2.02 | 1.58 |
| 12JL | SLH | 1.56 | 1.55 | 1.66 | 1.81 | 1.70 | 1.33 | 1.51 | 1.59 |
| 12JL | FRL | 1.24 | 1.12 | 1.58 | 1.78 | 1.71 | 1.79 | 1.72 | 1.75 |
| 12JL | FRH | 1.12 | 1.24 | 1.27 | 1.15 | 1.46 | 1.74 | 1.50 | 1.26 |
| 12JL | FCL | 1.52 | 1.34 | 1.42 | 1.42 | 1.35 | 1.39 | 1.29 | 1.40 |
| 12JL | FCH | 1.03 | 2.12 | 1.51 | 1.74 | 1.76 | 1.95 | 1.76 | 1.75 |
| 12JL | FLL | 1.53 | 1.53 | 1.81 | 1.64 | 1.61 | 1.89 | 1.54 | 1.55 |
| 12JL | FLH | 2.17 | 1.71 | 1.91 | 2.06 | 2.14 | 1.35 | 1.56 | 1.95 |

## RAW SCORES--MOVEMENT TIME (CONT'D)

| SUB-JECT ID | CONDI-TION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 13JL | SRL | 1.27 | 1.24 | 1.04 | 1.22 | 1.80 | 1.37 | 1.35 | 1.67 |
| 13JL | SRH | 1.35 | 1.20 | 1.03 | 1.20 | 1.70 | 1.30 | 1.50 | 1.31 |
| 13JL | SCL | 1.60 | 1.17 | 1.30 | .94 | 1.60 | 1.52 | 1.89 | 1.58 |
| 13JL | SCH | 1.90 | 1.93 | 1.93 | 1.93 | 1.90 | 1.91 | 1.98 | 1.65 |
| 13JL | SLL | 1.29 | 1.46 | 1.47 | 1.32 | 1.41 | 1.21 | 1.23 | 1.36 |
| 13JL | SLH | 1.67 | 1.68 | 1.87 | 1.50 | 1.89 | 1.66 | 1.28 | 1.37 |
| 13JL | FRL | 1.31 | 1.10 | 1.32 | .71 | 1.18 | 1.30 | 1.11 | 1.33 |
| 13JL | FRH | 1.26 | 1.22 | 1.22 | 1.26 | 1.28 | 1.42 | 1.63 | 1.61 |
| 13JL | FCL | 1.63 | 1.60 | 1.66 | 1.57 | 1.18 | 1.61 | 1.21 | 1.60 |
| 13JL | FCH | 1.50 | 1.52 | 1.98 | 1.55 | 1.57 | 1.16 | 1.81 | 1.45 |
| 13JL | FLL | 1.55 | 1.20 | 1.51 | 1.57 | 1.56 | 1.52 | 1.15 | 1.81 |
| 13JL | FLH | 1.44 | 1.58 | 1.39 | 1.70 | 1.35 | 1.29 | 1.45 | 1.47 |
| 14JL | SRL | .82 | 1.34 | 1.37 | 1.20 | 1.36 | 1.38 | 1.41 | 1.35 |
| 14JL | SRH | .92 | .82 | 1.13 | 1.20 | 1.20 | 1.19 | 1.18 | 1.35 |
| 14JL | SCL | 1.00 | .95 | 1.22 | 1.29 | 1.24 | 1.25 | 1.39 | 1.10 |
| 14JL | SCH | 1.29 | 1.33 | 1.59 | 1.48 | 1.90 | 1.86 | 1.73 | 1.94 |
| 14JL | SLL | 1.44 | 1.31 | 1.53 | 1.55 | 1.50 | 1.51 | 1.34 | 1.97 |
| 14JL | SLH | 1.19 | 1.28 | 1.51 | 1.53 | 1.58 | 1.57 | 1.55 | 1.60 |
| 14JL | FRL | 1.86 | 1.88 | 1.96 | 1.86 | 1.97 | 1.89 | 1.81 | 1.48 |
| 14JL | FRH | 1.85 | 1.74 | 1.23 | 1.34 | 1.35 | 1.36 | 1.48 | 1.37 |
| 14JL | FCL | 1.62 | 1.42 | 1.35 | 1.46 | 1.50 | 1.45 | 1.40 | 1.57 |
| 14JL | FCH | 1.63 | 1.19 | 1.90 | 1.41 | 1.35 | 1.37 | 1.39 | 1.49 |
| 14JL | FLL | 1.36 | 1.36 | 1.03 | 1.32 | 1.31 | 1.38 | 1.39 | 1.40 |
| 14JL | FLH | 1.80 | 1.90 | 1.82 | 1.39 | 1.84 | 1.81 | 1.87 | 1.51 |
| 15JL | SRL | 2.02 | 1.66 | 1.75 | 2.23 | 1.20 | 1.99 | 1.96 | 1.75 |
| 15JL | SRH | 1.30 | 1.73 | 1.25 | 1.63 | 1.85 | 1.82 | 1.75 | 1.91 |
| 15JL | SCL | 1.36 | 1.40 | 1.77 | 1.46 | 1.65 | 1.62 | 1.92 | 2.62 |
| 15JL | SCH | 2.02 | 1.70 | 1.32 | 1.81 | 2.05 | 2.01 | 2.19 | 2.03 |
| 15JL | SLL | 1.92 | 2.07 | 2.26 | 2.19 | 1.64 | 2.03 | 1.70 | 2.04 |
| 15JL | SLH | 1.91 | 2.00 | 1.95 | 1.92 | 1.60 | 1.93 | 1.97 | 2.08 |
| 15JL | FRL | 2.12 | 2.11 | 1.58 | 1.78 | 1.96 | 1.94 | 1.86 | 1.96 |
| 15JL | FRH | 1.54 | 1.74 | 2.53 | 2.11 | 2.13 | 2.21 | 2.31 | 1.90 |
| 15JL | FCL | 2.68 | 2.27 | 2.42 | 1.88 | 2.26 | 2.19 | 1.94 | 2.12 |
| 15JL | FCH | 1.75 | 1.81 | 2.32 | 1.43 | 1.91 | 1.87 | 1.80 | 1.87 |
| 15JL | FLL | 2.84 | 2.46 | 2.54 | 2.04 | 1.71 | 2.09 | 1.74 | 1.94 |
| 15JL | FLH | 2.43 | 2.21 | 1.90 | 2.17 | 2.51 | 2.20 | 1.88 | 2.32 |
| 16JL | SRL | 1.61 | 1.38 | 1.06 | 2.02 | 1.43 | 1.11 | 1.98 | 1.36 |
| 16JL | SRH | .91 | 1.23 | .95 | 1.22 | 1.21 | 1.10 | 1.36 | 1.20 |
| 16JL | SCL | 1.37 | 1.12 | 1.09 | 1.39 | 1.47 | 1.36 | 1.45 | 1.39 |
| 16JL | SCH | 1.08 | 1.53 | 1.74 | 1.12 | 1.18 | 1.17 | 1.20 | 1.16 |
| 16JL | SLL | 1.65 | 1.25 | 1.61 | 1.49 | 1.66 | 1.62 | 1.59 | 1.60 |
| 16JL | SLH | 1.62 | 1.84 | 1.37 | 1.80 | 2.07 | 1.58 | 1.84 | 1.86 |
| 16JL | FRL | 1.31 | .92 | 1.02 | 1.34 | 1.17 | 1.31 | 1.39 | 1.35 |
| 16JL | FRH | 1.88 | 1.67 | 1.88 | 1.72 | 1.64 | 1.82 | 1.82 | 1.80 |
| 16JL | FCL | 1.74 | 1.77 | 1.65 | 1.66 | 1.68 | 2.25 | 2.30 | 1.67 |
| 16JL | FCH | 1.31 | 1.67 | 1.71 | 1.74 | 2.12 | 1.73 | 2.15 | 1.70 |
| 16JL | FLL | 1.85 | 1.81 | 1.89 | 1.83 | 2.15 | 2.14 | 1.93 | 1.83 |
| 16JL | FLH | 1.82 | 1.83 | 1.86 | 1.78 | 2.10 | 2.02 | 1.64 | 1.80 |

## RAW SCORES--MOVEMENT TIME (CONT'D)

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 17JL | SRL | 1.20 | 1.26 | 1.22 | 1.13 | 1.10 | 1.22 | 1.53 | 1.19 |
| 17JL | SRH | 1.05 | 1.02 | .99 | .99 | 1.24 | 1.19 | 1.05 | 1.14 |
| 17JL | SCL | 1.10 | .95 | 1.28 | .95 | 1.15 | 1.00 | 1.10 | 1.02 |
| 17JL | SCH | 1.19 | 1.16 | 1.09 | 1.18 | 1.12 | 1.35 | 1.38 | 1.11 |
| 17JL | SLL | 1.18 | 1.38 | 1.39 | 1.13 | 1.35 | 1.17 | 1.39 | 1.32 |
| 17JL | SLH | 1.51 | 1.50 | 1.41 | 1.35 | 1.50 | 1.59 | 1.40 | 1.30 |
| 17JL | FRL | 1.53 | 1.27 | 1.35 | 1.31 | 1.52 | 1.60 | 1.65 | 1.52 |
| 17JL | FRH | 1.22 | 1.24 | 1.20 | 1.06 | 1.23 | 1.20 | 1.25 | 1.28 |
| 17JL | FCL | 1.60 | 1.61 | 1.65 | 1.51 | 1.62 | 1.45 | 1.56 | 1.62 |
| 17JL | FCH | 1.69 | 1.46 | 1.40 | 1.71 | 1.74 | 1.76 | 1.64 | 1.62 |
| 17JL | FLL | 1.67 | 1.80 | 1.71 | 1.65 | 1.90 | 1.65 | 1.64 | 1.45 |
| 17JL | FLH | 1.73 | 1.42 | 1.70 | 1.71 | 1.63 | 1.72 | 1.71 | 1.75 |
| 18JL | SRL | 1.43 | 1.40 | 1.24 | 1.15 | 1.40 | 1.25 | 1.41 | 1.46 |
| 18JL | SRH | 1.20 | 1.50 | 1.58 | 1.52 | 1.53 | 1.51 | 1.44 | 1.35 |
| 18JL | SCL | 1.45 | 1.42 | 1.50 | 1.30 | 1.27 | 1.30 | 1.47 | 1.35 |
| 18JL | SCH | 1.39 | 1.40 | 1.38 | 1.45 | 1.47 | 1.40 | 1.35 | 1.55 |
| 18JL | SLL | 1.54 | 1.56 | 1.41 | 1.20 | 1.67 | 1.57 | 1.36 | 1.24 |
| 18JL | SLH | 1.65 | 1.39 | 1.53 | 1.33 | 1.35 | 1.35 | 1.43 | 1.37 |
| 18JL | FRL | 1.43 | 1.47 | 1.42 | 1.48 | 1.33 | 1.57 | 1.15 | 1.00 |
| 18JL | FRH | 1.73 | 1.76 | 1.45 | 1.63 | 1.45 | 1.65 | 1.76 | 1.72 |
| 18JL | FCL | 1.23 | 1.46 | 1.44 | 1.47 | 1.20 | 1.42 | 1.42 | 1.32 |
| 18JL | FCH | 2.16 | 1.90 | 1.84 | 1.65 | 1.85 | 1.57 | 2.03 | 1.90 |
| 18JL | FLL | 1.72 | 1.53 | 1.52 | 1.29 | 1.65 | 1.52 | 1.55 | 1.54 |
| 18JL | FLH | 1.74 | 1.70 | 1.74 | 1.99 | 1.47 | 1.65 | 1.59 | 1.69 |
| 19HH | SRL | 1.56 | 1.50 | 1.55 | .92 | .83 | 1.51 | 1.37 | 1.71 |
| 19HH | SRH | 1.19 | 1.92 | 1.40 | 1.51 | 1.39 | 2.00 | 1.53 | 1.34 |
| 19HH | SCL | 1.25 | 1.16 | 1.44 | 1.26 | 1.16 | .91 | 1.22 | 1.38 |
| 19HH | SCH | 1.51 | 1.20 | 1.31 | 1.46 | 1.53 | 1.52 | 1.27 | 1.35 |
| 19HH | SLL | 1.96 | 1.59 | 1.74 | 1.49 | 1.42 | 1.59 | 1.57 | 1.23 |
| 19HH | SLH | 1.89 | 1.56 | 1.73 | 1.50 | 1.55 | 1.24 | 1.58 | 1.56 |
| 19HH | FRL | 2.17 | 1.99 | 1.72 | 1.31 | 1.39 | 1.40 | 1.61 | 1.32 |
| 19HH | FRH | 2.18 | 1.44 | 1.81 | 1.50 | 1.37 | 1.66 | 1.64 | 1.50 |
| 19HH | FCL | 2.11 | 1.60 | 1.77 | 1.27 | 1.29 | 1.32 | 1.52 | 1.26 |
| 19HH | FCH | 1.90 | 2.00 | 1.50 | 1.23 | 1.48 | 1.33 | 1.56 | 1.51 |
| 19HH | FLL | 1.93 | 1.82 | 1.80 | 1.49 | 1.46 | 1.51 | 1.64 | 1.49 |
| 19HH | FLH | 2.08 | 1.87 | 1.97 | 1.67 | 1.61 | 1.51 | 1.79 | 1.84 |
| 20HH | SRL | 1.09 | 1.46 | 1.88 | 1.37 | 1.39 | .92 | 1.33 | 1.35 |
| 20HH | SRH | 1.32 | 1.57 | 1.10 | 1.39 | 1.34 | 1.60 | 1.40 | 1.39 |
| 20HH | SCL | 1.27 | 1.53 | 1.39 | 1.83 | 1.22 | 1.81 | 1.82 | 1.55 |
| 20HH | SCH | 1.27 | 1.45 | 1.25 | 1.32 | 1.44 | 1.59 | 1.89 | 1.46 |
| 20HH | SLL | 1.29 | 1.46 | 1.19 | 1.50 | 1.48 | 1.56 | 1.71 | 1.45 |
| 20HH | SLH | 1.80 | 1.52 | 1.51 | 1.45 | 2.00 | 1.70 | 1.53 | 1.64 |
| 20HH | FRL | 1.57 | 1.55 | 1.44 | 1.39 | 1.55 | 1.57 | 1.66 | 1.53 |
| 20HH | FRH | 1.77 | 2.00 | 1.81 | 1.45 | 2.39 | 1.19 | 1.42 | 1.72 |
| 20HH | FCL | 1.75 | 1.75 | 1.86 | 1.50 | 1.32 | 1.57 | 1.42 | 1.59 |
| 20HH | FCH | 2.05 | 1.97 | 1.54 | 1.72 | 1.77 | 1.81 | 1.80 | 1.81 |
| 20HH | FLL | 1.41 | 1.68 | 1.52 | 1.33 | 1.44 | 1.48 | 1.51 | 1.48 |
| 20HH | FLH | 1.96 | 1.76 | 1.72 | 1.70 | 1.56 | 1.81 | 1.73 | 1.75 |

## RAW SCORES--MOVEMENT TIME (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 21HH | SRL | 1.11 | .92 | 1.06 | .89 | .98 | 1.46 | 1.04 | 1.39 |
| 21HH | SRH | .88 | .86 | 1.50 | 1.32 | 1.16 | 1.17 | 1.28 | 1.18 |
| 21HH | SCL | 1.27 | 1.07 | 1.45 | 1.52 | 1.25 | 1.05 | 1.09 | 1.47 |
| 21HH | SCH | 1.09 | 1.64 | 1.31 | 1.18 | 1.36 | 1.38 | 1.67 | 1.39 |
| 21HH | SLL | 1.36 | 1.51 | 1.54 | 1.37 | 1.40 | 1.19 | 1.53 | 1.29 |
| 21HH | SLH | 1.65 | 1.48 | 1.33 | 1.41 | 1.38 | 1.42 | 1.53 | 1.64 |
| 21HH | FRL | 1.40 | 1.58 | 1.47 | 1.41 | 1.50 | 1.93 | 1.77 | 1.59 |
| 21HH | FRH | 2.11 | 1.75 | 1.71 | 1.45 | 1.60 | 1.75 | 1.53 | 1.70 |
| 21HH | FCL | 1.69 | 1.54 | 1.60 | 1.85 | 1.50 | 1.73 | 1.78 | 1.67 |
| 21HH | FCH | 1.96 | 1.70 | 2.00 | 1.60 | 1.47 | 1.88 | 1.77 | 1.75 |
| 21HH | FLL | 1.69 | 1.69 | 1.61 | 2.01 | 1.36 | 1.52 | 1.71 | 1.95 |
| 21HH | FLH | 1.88 | 1.90 | 1.72 | 1.90 | 2.02 | 1.85 | 2.18 | 1.60 |
| 22HH | SRL | .90 | 1.18 | 1.07 | .50 | .82 | .57 | .78 | .75 |
| 22HH | SRH | 1.53 | 1.14 | 1.64 | 1.09 | .82 | .55 | .99 | .98 |
| 22HH | SCL | 1.60 | 1.37 | 1.48 | 2.48 | 1.04 | .97 | 1.02 | 1.01 |
| 22HH | SCH | 1.44 | 1.82 | 1.09 | 1.20 | 1.31 | 1.01 | 1.09 | 1.28 |
| 22HH | SLL | 1.01 | 1.30 | 1.99 | 1.48 | 1.20 | 1.14 | 1.05 | 1.20 |
| 22HH | SLH | 1.70 | 1.58 | 1.33 | 1.59 | .97 | 1.06 | 1.23 | 1.17 |
| 22HH | FRL | 1.87 | 1.60 | 1.82 | 1.44 | 1.06 | 1.32 | 1.11 | 1.32 |
| 22HH | FRH | 1.83 | 1.65 | 2.26 | 1.52 | 1.38 | 1.15 | 1.29 | 1.58 |
| 22HH | FCL | 1.72 | 1.64 | 2.05 | 1.09 | 1.29 | 1.48 | 1.26 | 1.34 |
| 22HH | FCH | 2.28 | 2.22 | 2.06 | 1.24 | 1.11 | 1.39 | 1.65 | 1.26 |
| 22HH | FLL | 1.83 | 2.01 | 1.98 | 1.19 | 1.53 | 1.17 | 1.25 | 1.31 |
| 22HH | FLH | 1.68 | 2.29 | 1.79 | 2.09 | 1.36 | 1.37 | 1.50 | 1.34 |
| 23HH | SRL | 1.39 | 1.69 | 1.28 | 1.21 | 1.21 | 1.19 | 1.00 | 1.26 |
| 23HH | SRH | 1.49 | 1.03 | 1.26 | 1.40 | 1.03 | 1.05 | 1.26 | 1.57 |
| 23HH | SCL | 1.30 | 1.36 | 1.18 | 1.11 | 1.21 | 1.28 | .91 | 1.07 |
| 23HH | SCH | 1.62 | 1.73 | 1.39 | 1.53 | 1.46 | 1.12 | 1.38 | .91 |
| 23HH | SLL | 1.49 | 1.70 | 1.38 | 1.39 | 1.20 | 1.23 | 1.36 | 1.29 |
| 23HH | SLH | 1.69 | 1.38 | 1.37 | 1.52 | 1.19 | 1.37 | 1.22 | 1.23 |
| 23HH | FRL | 1.83 | 1.56 | 1.55 | 1.44 | 1.75 | 1.27 | 1.16 | 1.81 |
| 23HH | FRH | 1.72 | 1.90 | 1.61 | 1.87 | 1.46 | 1.35 | 1.70 | 1.25 |
| 23HH | FCL | 1.54 | 1.39 | 1.32 | 1.28 | 1.31 | 1.19 | 1.25 | 1.29 |
| 23HH | FCH | 1.78 | 1.56 | 1.46 | 1.41 | 1.46 | 1.44 | 1.31 | 1.29 |
| 23HH | FLL | 1.42 | 1.88 | 1.26 | 1.54 | 1.17 | 1.28 | 1.32 | 1.18 |
| 23HH | FLH | 1.62 | 1.66 | 1.55 | 1.76 | 1.47 | 1.44 | 1.51 | 1.36 |
| 24HH | SRL | 1.36 | 1.41 | 1.52 | 1.43 | 1.29 | 1.73 | 1.27 | 1.26 |
| 24HH | SRH | 1.83 | 1.64 | 1.97 | 1.69 | 2.09 | 1.21 | 1.20 | 1.51 |
| 24HH | SCL | 1.51 | 1.19 | 1.17 | 1.23 | 1.21 | .79 | 1.20 | 1.23 |
| 24HH | SCH | 1.66 | 1.51 | 1.46 | 1.14 | 1.64 | 1.73 | 1.22 | 1.70 |
| 24HH | SLL | 1.88 | 1.60 | 1.43 | 1.64 | 1.64 | 1.36 | 1.59 | 1.65 |
| 24HH | SLH | 1.61 | 1.40 | 1.39 | 1.49 | 1.27 | 1.50 | 1.29 | 1.23 |
| 24HH | FRL | 1.34 | 1.47 | 1.59 | 1.43 | 1.48 | 1.64 | 1.47 | 1.36 |
| 24HH | FRH | 1.88 | 1.62 | 1.77 | 1.39 | 1.78 | 1.39 | 1.56 | 1.57 |
| 24HH | FCL | 1.76 | 1.67 | 1.69 | 1.69 | 1.61 | 1.70 | 1.61 | 1.66 |
| 24HH | FCH | 1.86 | 1.57 | 1.49 | 1.50 | 1.79 | 1.50 | 1.31 | 1.53 |
| 24HH | FLL | 1.64 | 1.54 | 1.43 | 2.10 | 1.43 | 1.32 | 1.43 | 1.44 |
| 24HH | FLH | 1.60 | 1.40 | 1.42 | 1.55 | 1.35 | 1.22 | 1.36 | 1.33 |

## RAW SCORES--MOVEMENT TIME

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 25HH | SRL | .97 | 1.05 | 1.17 | .90 | 1.23 | 1.34 | 1.14 | 1.11 |
| 25HH | SRH | .94 | 1.26 | 1.59 | 1.59 | 1.29 | 1.40 | .86 | 1.16 |
| 25HH | SCL | 1.17 | 1.24 | 1.23 | 1.18 | 1.00 | 1.28 | .96 | 1.29 |
| 25HH | SCH | 1.23 | 1.37 | 1.37 | 1.26 | 1.37 | 1.09 | 1.88 | 1.37 |
| 25HH | SLL | 1.47 | 1.53 | 1.44 | 1.23 | 1.61 | 1.35 | 1.45 | 1.44 |
| 25HH | SLH | 1.24 | 1.36 | 1.29 | 1.59 | 1.31 | 1.24 | 1.56 | 1.27 |
| 25HH | FRL | 1.50 | 2.21 | 1.54 | 1.67 | 1.33 | 1.54 | 1.15 | 1.38 |
| 25HH | FRH | 1.74 | 1.54 | 1.60 | 2.01 | 1.45 | 1.53 | 1.47 | 1.45 |
| 25HH | FCL | 1.33 | 1.22 | 1.90 | 1.17 | 1.37 | 1.30 | 1.57 | 1.41 |
| 25HH | FCH | 1.09 | 1.41 | 1.45 | 1.69 | 1.38 | 1.63 | 1.13 | 1.47 |
| 25HH | FLL | 1.17 | 1.42 | 1.46 | 1.87 | 1.29 | 1.25 | 1.38 | 1.51 |
| 25HH | FLH | 1.57 | 1.50 | 1.86 | 1.49 | 1.35 | 1.61 | 1.50 | 1.97 |
| 26HH | SRL | 1.53 | 1.33 | 1.15 | 1.45 | 1.29 | 1.28 | 1.16 | 1.31 |
| 26HH | SRH | 1.68 | 1.35 | 1.46 | 1.35 | 1.60 | 1.52 | 1.18 | .68 |
| 26HH | SCL | 1.58 | 1.60 | .92 | 1.19 | 1.34 | 1.33 | 1.23 | 1.31 |
| 26HH | SCH | 1.39 | 1.15 | 1.36 | 1.48 | 1.61 | 1.28 | 1.38 | 1.48 |
| 26HH | SLL | 1.12 | 1.54 | 1.29 | 1.00 | 1.43 | 1.18 | 1.43 | 1.32 |
| 26HH | SLH | 1.00 | 1.67 | 1.02 | 1.33 | 1.38 | 1.52 | 1.36 | 1.58 |
| 26HH | FRL | 1.95 | 1.59 | 1.70 | 1.66 | 1.21 | 1.46 | 1.59 | 1.62 |
| 26HH | FRH | 1.74 | 1.82 | 1.65 | 1.50 | 1.65 | 1.51 | 1.88 | 1.68 |
| 26HH | FCL | 1.20 | 1.42 | 1.84 | 1.44 | 1.53 | 1.34 | 1.49 | 1.66 |
| 26HH | FCH | 2.10 | 1.39 | 1.66 | 1.50 | 1.37 | 1.57 | 1.91 | 1.64 |
| 26HH | FLL | 2.19 | 2.04 | 1.99 | 1.47 | 1.51 | 1.63 | 1.45 | 1.75 |
| 26HH | FLH | 1.70 | 2.12 | 1.71 | 1.45 | 1.71 | 1.95 | 1.67 | 1.76 |
| 27HH | SRL | 1.54 | .88 | 1.59 | 1.65 | 1.66 | 1.60 | 2.01 | 1.91 |
| 27HH | SRH | 1.61 | 1.38 | 1.42 | 1.46 | 1.67 | 1.81 | 1.79 | 1.74 |
| 27HH | SCL | 1.38 | 1.76 | 1.54 | .90 | 1.33 | 1.44 | 2.00 | 1.48 |
| 27HH | SCH | 1.38 | 1.70 | 1.87 | 1.04 | 1.57 | 1.34 | 1.38 | 1.98 |
| 27HH | SLL | 1.71 | 1.25 | 1.85 | 1.41 | 1.46 | 1.60 | 1.73 | 1.80 |
| 27HH | SLH | 1.39 | 1.27 | 1.98 | 1.19 | 1.11 | 1.10 | 1.45 | 1.36 |
| 27HH | FRL | 1.61 | 1.54 | 1.46 | 1.37 | 1.49 | 1.51 | 1.43 | 1.54 |
| 27HH | FRH | 1.99 | 1.84 | 1.85 | 1.69 | 1.52 | 1.92 | 2.04 | 1.84 |
| 27HH | FCL | 1.87 | 1.76 | 2.12 | 1.79 | 1.54 | 1.52 | 1.40 | 1.71 |
| 27HH | FCH | 1.86 | 1.83 | 1.95 | 1.58 | 2.06 | 1.60 | 1.71 | 1.79 |
| 27HH | FLL | 1.68 | 1.70 | 1.72 | 1.53 | 1.92 | 1.64 | 1.64 | 1.69 |
| 27HH | FLH | 1.71 | 2.13 | 1.82 | 1.69 | 1.72 | 2.00 | 1.72 | 1.83 |
| 28HL | SRL | 1.42 | 1.52 | 2.33 | 1.49 | 1.54 | 1.13 | 1.35 | 1.20 |
| 28HL | SRH | 1.34 | 1.47 | 1.28 | 1.40 | 1.64 | 1.40 | 1.51 | 1.72 |
| 28HL | SCL | 1.15 | 1.91 | 1.45 | 1.19 | .99 | .88 | .77 | 1.17 |
| 28HL | SCH | 1.78 | 1.36 | 1.29 | 1.09 | 1.30 | .83 | 1.37 | 1.00 |
| 28HL | SLL | 1.00 | .81 | 1.07 | 1.38 | .97 | .75 | 1.32 | 1.26 |
| 28HL | SLH | 2.23 | 1.33 | 1.70 | 1.12 | 1.08 | .87 | 1.15 | 1.16 |
| 28HL | FRL | 1.68 | 1.06 | 1.39 | 1.48 | 1.56 | 1.56 | 1.89 | 1.87 |
| 28HL | FRH | 1.88 | 1.78 | 1.88 | 2.40 | 1.33 | 2.05 | 1.68 | 1.36 |
| 28HL | FCL | .86 | 1.47 | 1.07 | 1.64 | 1.08 | 1.11 | .68 | .68 |
| 28HL | FCH | .89 | 1.07 | 1.72 | 1.27 | 1.10 | .87 | 1.74 | 1.51 |
| 28HL | FLL | .71 | 1.62 | 2.10 | 1.07 | 1.33 | 1.35 | 1.17 | 1.34 |
| 28HL | FLH | 1.80 | 1.05 | 1.53 | 2.16 | 1.71 | 1.21 | 1.33 | 1.47 |

RAW SCORES--MOVEMENT TIME (CONT'D)

| SUB-JECT ID | CONDI-TION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 29HL | SRL | .98 | 1.48 | .81 | .84 | .46 | 1.17 | .53 | .44 |
| 29HL | SRH | .88 | .67 | .61 | .76 | .21 | .85 | .50 | .43 |
| 29HL | SCL | 1.12 | .95 | .74 | .73 | .54 | .63 | .58 | .63 |
| 29HL | SCH | 1.43 | .85 | .89 | .82 | .71 | .81 | .64 | .61 |
| 29HL | SLL | 1.39 | 1.15 | 1.22 | .88 | 1.00 | .92 | .79 | .66 |
| 29HL | SLH | 1.41 | 1.15 | 1.17 | .78 | 1.02 | .75 | .71 | 1.16 |
| 29HL | FRL | .97 | .84 | .80 | .87 | .75 | .87 | .89 | .83 |
| 29HL | FRH | .67 | .54 | 1.01 | 1.28 | .35 | .71 | .42 | .40 |
| 29HL | FCL | 1.02 | 1.07 | 1.03 | .86 | .67 | .55 | 1.03 | .65 |
| 29HL | FCH | .98 | .93 | 1.00 | .89 | .87 | .84 | .85 | .82 |
| 29HL | FLL | 1.26 | 1.15 | 1.48 | 1.16 | .96 | 1.23 | 1.01 | .94 |
| 29HL | FLH | 1.17 | 1.08 | 1.15 | 1.12 | .96 | 1.06 | 1.01 | 1.09 |
| 30HL | SRL | 1.76 | 1.99 | 1.00 | 1.49 | 1.30 | .83 | 1.17 | .87 |
| 30HL | SRH | 1.14 | .92 | 1.05 | 1.56 | 1.57 | 1.24 | .82 | .84 |
| 30HL | SCL | 1.21 | 1.02 | 1.18 | 1.59 | 1.11 | 1.23 | 1.30 | 1.03 |
| 30HL | SCH | 1.59 | 1.33 | 1.52 | 1.43 | 1.40 | .96 | .99 | 1.32 |
| 30HL | SLL | 1.59 | 1.65 | 1.61 | 1.66 | 1.61 | 1.71 | 1.39 | 1.70 |
| 30HL | SLH | 1.69 | 1.78 | 2.05 | 2.05 | 1.74 | 1.38 | 1.21 | 1.61 |
| 30HL | FRL | 1.56 | 1.63 | 2.04 | 1.38 | 1.40 | 1.45 | 1.81 | 1.78 |
| 30HL | FRH | 1.58 | 2.21 | 1.78 | 1.75 | 1.49 | 1.74 | 1.85 | 1.61 |
| 30HL | FCL | 1.75 | 1.68 | 1.64 | 2.17 | 1.49 | 1.61 | 1.60 | 1.47 |
| 30HL | FCH | 2.24 | 2.35 | 1.78 | 1.94 | 1.95 | 1.90 | 2.01 | 1.06 |
| 30HL | FLL | 1.62 | 2.12 | 1.90 | 1.48 | 1.71 | 1.60 | 1.85 | 1.40 |
| 30HL | FLH | 1.98 | 1.93 | 2.19 | 2.18 | 1.99 | 1.73 | 1.82 | 1.66 |
| 31HL | SRL | 1.74 | 1.23 | 1.26 | 1.40 | 1.09 | 1.26 | 1.98 | 1.42 |
| 31HL | SRH | 1.17 | 2.06 | 1.61 | 1.75 | 1.21 | 1.62 | 1.17 | 1.96 |
| 31HL | SCL | 1.36 | 1.15 | 1.17 | 1.63 | 1.14 | 1.64 | 1.33 | 1.44 |
| 31HL | SCH | 1.15 | 1.38 | 1.47 | .71 | 1.95 | 1.09 | 1.65 | 1.63 |
| 31HL | SLL | 1.14 | 1.10 | 1.25 | .66 | 1.95 | 1.94 | 1.98 | 1.43 |
| 31HL | SLH | 1.73 | 1.49 | .91 | 1.52 | 1.40 | 1.68 | 1.39 | 1.06 |
| 31HL | FRL | 1.56 | 1.78 | 1.43 | 1.69 | 1.39 | 1.63 | 1.29 | 1.80 |
| 31HL | FRH | 1.85 | 1.67 | 1.76 | 1.39 | 1.90 | 1.70 | 1.40 | 1.95 |
| 31HL | FCL | 1.41 | 1.53 | 1.62 | 2.02 | 1.47 | 1.24 | 1.35 | 1.20 |
| 31HL | FCH | 2.20 | 1.91 | 1.56 | 1.40 | 1.39 | 1.10 | 1.62 | 1.55 |
| 31HL | FLL | 2.06 | 2.22 | 1.74 | 1.61 | 1.35 | 1.68 | 1.58 | 1.21 |
| 31HL | FLH | 2.11 | 2.07 | 2.12 | 1.91 | 1.87 | 1.55 | 1.67 | 1.57 |
| 32HL | SRL | .96 | .94 | 1.18 | .97 | 1.02 | 1.20 | .92 | .98 |
| 32HL | SRH | .66 | .82 | 1.06 | .85 | .91 | .95 | .92 | 1.12 |
| 32HL | SCL | 1.11 | 1.42 | 1.10 | 1.49 | .93 | .92 | .88 | .97 |
| 32HL | SCH | .89 | 1.31 | 1.01 | 1.07 | .96 | .93 | .97 | .92 |
| 32HL | SLL | 1.85 | 1.79 | 1.49 | 1.67 | 1.91 | 1.85 | 1.90 | 1.92 |
| 32HL | SLH | 1.42 | 1.75 | 1.40 | 1.95 | 1.78 | 1.88 | 1.91 | 1.90 |
| 32HL | FRL | .85 | 1.03 | 1.40 | 1.33 | 1.36 | 1.59 | 1.56 | 1.55 |
| 32HL | FRH | 1.18 | 1.38 | .91 | 1.04 | .94 | .91 | 1.03 | .91 |
| 32HL | FCL | 1.47 | 1.14 | 1.38 | 1.18 | 1.21 | 1.16 | 1.10 | 1.03 |
| 32HL | FCH | 1.43 | 1.41 | 1.56 | 1.53 | 1.42 | 1.39 | 1.38 | 1.24 |
| 32HL | FLL | 1.85 | 1.59 | 1.44 | 1.90 | 1.21 | 1.15 | 1.11 | 1.27 |
| 32HL | FLH | 1.44 | 1.69 | 1.45 | 1.67 | 1.32 | 1.28 | 1.30 | 1.43 |

# RAW SCORES--MOVEMENT TIME (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 33HL | SRL | 1.35 | 1.34 | 1.43 | 1.40 | 1.46 | 1.33 | 1.59 | 1.33 |
| 33HL | SRH | 1.98 | 1.75 | 2.07 | 1.88 | 1.58 | 1.97 | 1.94 | 1.85 |
| 33HL | SCL | 2.15 | 2.03 | 1.43 | 1.86 | 1.63 | 1.90 | 1.91 | 1.98 |
| 33HL | SCH | 1.53 | 2.51 | 1.76 | 1.97 | 1.95 | 1.58 | 2.07 | 1.47 |
| 33HL | SLL | 2.07 | 2.05 | 1.95 | 1.92 | 1.82 | 1.85 | 1.84 | 1.88 |
| 33HL | SLH | 2.36 | 2.26 | 2.39 | 2.42 | 2.59 | 2.51 | 2.41 | 2.39 |
| 33HL | FRL | 2.26 | 2.38 | 1.73 | 2.21 | 2.24 | 2.25 | 2.50 | 2.15 |
| 33HL | FRH | 2.49 | 2.38 | 2.83 | 2.41 | 2.22 | 2.17 | 2.31 | 2.44 |
| 33HL | FCL | 1.67 | 1.77 | 1.51 | 2.41 | 1.45 | 1.93 | 1.51 | 1.77 |
| 33HL | FCH | 2.26 | 1.77 | 2.26 | 1.78 | 1.58 | 1.50 | 1.45 | 1.65 |
| 33HL | FLL | 2.06 | 1.82 | 2.07 | 1.57 | 1.50 | 1.43 | 1.58 | 1.51 |
| 33HL | FLH | 2.38 | 2.24 | 2.38 | 2.45 | 2.45 | 2.67 | 2.49 | 2.54 |
| 34HL | SRL | 1.02 | .98 | .92 | .86 | .80 | 1.16 | .86 | 1.88 |
| 34HL | SRH | .48 | .89 | 1.08 | 1.08 | .95 | .99 | .87 | .81 |
| 34HL | SCL | 1.26 | .97 | 1.39 | .81 | 1.21 | 1.32 | 1.22 | 1.48 |
| 34HL | SCH | 1.06 | .80 | 1.44 | 1.05 | 1.12 | 1.09 | .92 | 1.22 |
| 34HL | SLL | 1.38 | 1.35 | 1.35 | .45 | 1.52 | 1.26 | 1.41 | 1.39 |
| 34HL | SLH | 1.27 | 1.37 | 1.01 | .76 | .95 | 1.07 | 1.02 | 1.13 |
| 34HL | FRL | .69 | .88 | .84 | .70 | 1.11 | .84 | .88 | 1.11 |
| 34HL | FRH | .53 | .98 | .85 | .95 | 1.09 | 1.00 | 1.89 | 1.42 |
| 34HL | FCL | 1.26 | 1.46 | 1.26 | .97 | .92 | .72 | 1.16 | 1.77 |
| 34HL | FCH | 1.41 | 1.43 | .83 | 1.44 | 1.09 | .94 | 1.43 | .97 |
| 34HL | FLL | 1.35 | 1.32 | 1.64 | 1.32 | 1.42 | 1.40 | 1.24 | 1.66 |
| 34HL | FLH | 1.23 | 1.46 | 1.18 | 1.57 | 1.03 | 1.39 | 1.63 | .78 |
| 35HL | SRL | 1.01 | 1.31 | 1.03 | 1.00 | .95 | .71 | 1.02 | 1.21 |
| 35HL | SRH | 1.08 | 1.34 | .87 | 1.34 | 1.12 | .71 | 1.04 | 1.16 |
| 35HL | SCL | .83 | 1.03 | 1.07 | .91 | 1.00 | .90 | 1.01 | 1.23 |
| 35HL | SCH | .71 | 1.72 | 1.00 | .97 | .95 | .99 | .74 | .83 |
| 35HL | SLL | 1.58 | 1.65 | 1.34 | 1.05 | 1.09 | 1.31 | 1.21 | 1.28 |
| 35HL | SLH | 1.44 | 1.39 | 1.47 | 1.29 | 1.21 | 1.13 | 1.13 | 1.26 |
| 35HL | FRL | 1.15 | 1.08 | 1.76 | 1.42 | .80 | .63 | 1.23 | 1.10 |
| 35HL | FRH | 1.84 | 2.00 | 1.07 | 1.48 | 1.34 | 1.12 | 1.68 | 1.63 |
| 35HL | FCL | 1.69 | 1.57 | 1.41 | 1.68 | 1.21 | 1.37 | 1.18 | 1.20 |
| 35HL | FCH | 1.68 | 1.47 | 1.62 | 2.03 | 1.17 | 1.12 | 1.38 | 1.32 |
| 35HL | FLL | 1.59 | 1.44 | 1.64 | 1.38 | 1.12 | 1.23 | 1.39 | 1.26 |
| 35HL | FLH | 2.16 | 1.61 | 1.75 | 1.63 | 1.40 | 1.36 | 1.44 | 1.53 |
| 36HL | SRL | 1.34 | 1.53 | 1.16 | 1.65 | .89 | .57 | .39 | .90 |
| 36HL | SRH | 1.49 | 1.21 | .86 | .88 | .98 | .69 | .58 | 1.07 |
| 36HL | SCL | 1.00 | 1.24 | 1.18 | 1.19 | 1.44 | .97 | 1.04 | 1.36 |
| 36HL | SCH | 1.31 | 1.22 | 1.06 | 1.37 | 1.65 | 1.25 | 1.67 | .97 |
| 36HL | SLL | 1.41 | 1.68 | 1.19 | 1.78 | 1.31 | 1.23 | 1.40 | 1.31 |
| 36HL | SLH | 1.32 | 1.44 | 1.21 | 1.56 | 1.47 | 1.24 | .98 | 1.33 |
| 36HL | FRL | 1.60 | .99 | 1.01 | 1.08 | 1.17 | .97 | .43 | .81 |
| 36HL | FRH | 1.43 | 1.46 | 1.80 | 1.26 | 1.23 | 1.29 | 1.83 | 1.37 |
| 36HL | FCL | 1.61 | 1.44 | 2.27 | 1.27 | 1.05 | 1.26 | 1.10 | 1.50 |
| 36HL | FCH | 1.45 | 2.06 | 1.86 | 1.61 | 1.24 | 1.46 | .33 | 1.57 |
| 36HL | FLL | 1.75 | 1.00 | 2.12 | 1.17 | 1.34 | 1.07 | 1.03 | 1.25 |
| 36HL | FLH | 1.70 | 1.78 | 1.74 | 1.58 | 1.58 | 1.44 | 1.45 | 1.37 |

## RAW SCORES--MOVEMENT TIME (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 37CH | SRL | 1.57 | 1.30 | 1.11 | 1.32 | 1.24 | 1.36 | 1.24 | 1.58 |
| 37CH | SRH | 1.66 | 1.64 | 1.21 | 1.14 | 1.20 | 1.16 | 1.20 | 1.11 |
| 37CH | SCL | .96 | 1.46 | 1.29 | 1.31 | 1.21 | 1.31 | 1.49 | 1.46 |
| 37CH | SCH | .95 | .93 | 1.31 | .98 | .98 | .97 | .75 | .97 |
| 37CH | SLL | 1.35 | 1.31 | 1.67 | 1.40 | 1.24 | 1.40 | 1.40 | 1.49 |
| 37CH | SLH | 1.27 | 1.23 | 1.39 | 1.29 | 1.23 | 1.30 | 1.32 | 1.35 |
| 37CH | FRL | 1.10 | 1.54 | 1.14 | 1.22 | 1.10 | 1.24 | 1.12 | 1.38 |
| 37CH | FRH | 1.49 | 1.65 | 1.52 | 1.58 | 1.71 | 1.59 | 1.66 | 1.46 |
| 37CH | FCL | 1.36 | 1.49 | 1.45 | 1.39 | 1.54 | 1.40 | 1.25 | 1.26 |
| 37CH | FCH | 1.28 | 1.63 | 1.56 | 1.67 | 1.69 | 1.67 | 1.72 | 1.54 |
| 37CH | FLL | 1.32 | 1.29 | 1.31 | 1.36 | 1.32 | 1.37 | 1.36 | 1.59 |
| 37CH | FLH | 1.35 | 1.52 | 1.39 | 1.55 | 1.65 | 1.54 | 1.60 | 1.78 |
| 38CH | SRL | 1.59 | .81 | .81 | .92 | .86 | 1.01 | .76 | .72 |
| 38CH | SRH | .97 | 1.24 | .97 | 1.07 | 1.09 | 1.10 | .90 | 1.39 |
| 38CH | SCL | 1.15 | 1.19 | 1.11 | .96 | .74 | .93 | .77 | .67 |
| 38CH | SCH | 1.06 | .63 | .94 | .88 | .94 | .91 | .75 | 1.00 |
| 38CH | SLL | 1.52 | 1.34 | 1.56 | 1.46 | 1.45 | 1.49 | 1.42 | 1.49 |
| 38CH | SLH | 1.53 | 1.42 | 1.44 | 1.44 | 1.30 | 1.48 | 1.19 | 1.77 |
| 38CH | FRL | 1.25 | 1.51 | 1.26 | 1.38 | 1.25 | 1.52 | 1.57 | 2.09 |
| 38CH | FRH | 1.88 | 1.68 | 1.45 | 1.62 | 1.62 | 1.65 | 1.85 | 1.87 |
| 38CH | FCL | 1.33 | 1.35 | 1.61 | 1.48 | 1.80 | 1.62 | 1.65 | 1.58 |
| 38CH | FCH | 1.57 | 1.55 | 1.57 | 1.62 | 1.66 | 1.67 | 1.70 | 1.79 |
| 38CH | FLL | 1.64 | 1.54 | 1.36 | 1.55 | 1.64 | 1.50 | 1.47 | 1.50 |
| 38CH | FLH | 1.91 | 1.80 | 1.50 | 1.70 | 1.66 | 1.55 | 2.04 | 1.77 |
| 39CH | SRL | 1.40 | 1.22 | 1.22 | 1.29 | 1.27 | 1.07 | 1.15 | 1.20 |
| 39CH | SRH | 1.81 | 1.31 | 1.28 | 1.29 | 1.42 | 1.50 | 1.51 | 1.38 |
| 39CH | SCL | 1.16 | 1.21 | 1.29 | 1.20 | 1.25 | 1.40 | 1.31 | 1.20 |
| 39CH | SCH | 1.36 | 1.43 | 1.45 | 1.38 | 1.37 | 1.41 | 1.35 | 1.24 |
| 39CH | SLL | 1.53 | 1.31 | 1.33 | 1.20 | 1.31 | 1.32 | 1.28 | 1.24 |
| 39CH | SLH | 1.60 | 1.50 | 1.49 | 1.63 | 1.52 | 1.32 | 1.61 | 1.67 |
| 39CH | FRL | 1.16 | 1.26 | 1.33 | 1.23 | 1.39 | 1.36 | 1.31 | 1.62 |
| 39CH | FRH | 1.39 | 1.30 | 1.16 | 1.54 | 1.48 | 1.25 | 1.43 | 1.18 |
| 39CH | FCL | 1.53 | 1.47 | 1.31 | 1.31 | 1.42 | 1.26 | 1.24 | 1.17 |
| 39CH | FCH | 1.44 | 1.24 | 1.15 | 1.28 | 1.30 | 1.15 | 1.18 | 1.15 |
| 39CH | FLL | 1.41 | 1.31 | 1.38 | 1.42 | 1.36 | 1.25 | 1.38 | 1.44 |
| 39CH | FLH | 1.18 | 1.38 | 1.21 | 1.23 | 1.27 | 1.09 | 1.18 | 1.27 |
| 40CH | SRL | .84 | .92 | 1.00 | .89 | .97 | 1.15 | 1.10 | 1.01 |
| 40CH | SRH | 1.25 | 1.30 | .79 | 1.26 | 1.27 | .84 | 1.16 | 1.34 |
| 40CH | SCL | .95 | 1.36 | 1.18 | 1.20 | 1.21 | 1.31 | 1.34 | 1.35 |
| 40CH | SCH | .79 | 1.09 | 1.18 | 1.29 | 1.19 | 1.39 | 1.23 | 1.13 |
| 40CH | SLL | 1.48 | 1.33 | 1.36 | 1.46 | 1.40 | 1.56 | 1.51 | 1.47 |
| 40CH | SLH | .98 | 1.42 | 1.39 | 1.22 | 1.25 | 1.27 | 1.31 | 1.33 |
| 40CH | FRL | 1.43 | 1.48 | 1.19 | 1.36 | 1.37 | 1.55 | 1.58 | 1.62 |
| 40CH | FRH | 1.56 | 1.61 | 1.38 | 1.54 | 1.60 | 1.42 | 1.45 | 1.67 |
| 40CH | FCL | 1.37 | 1.43 | 1.28 | 1.59 | 1.44 | 1.61 | 1.58 | 1.53 |
| 40CH | FCH | 1.51 | 1.61 | 1.82 | 1.46 | 1.52 | 1.58 | 1.70 | 1.91 |
| 40CH | FLL | 1.36 | 1.63 | 1.79 | 1.52 | 1.53 | 1.61 | 1.67 | 1.77 |
| 40CH | FLH | 1.53 | 1.34 | 1.60 | 1.92 | 1.81 | 1.76 | 1.63 | 1.49 |

## RAW SCORES--MOVEMENT TIME (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 41CH | SRL | 1.51 | 1.59 | 1.47 | 1.52 | 1.21 | 1.46 | 1.20 | 1.43 |
| 41CH | SRH | 1.28 | 1.33 | 1.61 | 1.40 | 1.24 | 1.50 | 1.72 | 1.63 |
| 41CH | SCL | 1.78 | 1.25 | 1.39 | 1.40 | 1.45 | 1.39 | 1.38 | 1.37 |
| 41CH | SCH | 1.33 | 1.22 | 1.45 | 1.45 | 1.46 | 1.49 | 1.52 | 1.41 |
| 41CH | SLL | 1.69 | 1.38 | 1.59 | 1.61 | 1.65 | 1.61 | 1.56 | 1.77 |
| 41CH | SLH | 1.52 | 1.78 | 1.81 | 1.80 | 1.74 | 1.72 | 1.71 | 1.69 |
| 41CH | FRL | 1.39 | 1.76 | 1.41 | 1.35 | 1.28 | 1.28 | 1.28 | 1.25 |
| 41CH | FRH | 1.46 | 1.56 | 1.38 | 1.41 | 1.57 | 1.52 | 1.50 | 1.45 |
| 41CH | FCL | 1.85 | 1.29 | 1.46 | 1.38 | 1.30 | 1.27 | 1.23 | 1.47 |
| 41CH | FCH | 1.75 | 1.62 | 1.47 | 1.53 | 1.59 | 1.41 | 1.38 | 1.30 |
| 41CH | FLL | 1.88 | 1.57 | 1.34 | 1.51 | 1.57 | 1.51 | 1.45 | 1.28 |
| 41CH | FLH | 1.81 | 1.44 | 1.45 | 1.36 | 1.28 | 1.31 | 1.31 | 1.23 |
| 42CH | SRL | 1.12 | 1.27 | 1.23 | 1.25 | 1.26 | 1.16 | 1.10 | 1.21 |
| 42CH | SRH | 1.19 | 1.29 | 1.26 | 1.28 | 1.30 | 1.32 | 1.32 | 1.30 |
| 42CH | SCL | 1.87 | 1.52 | 1.51 | 1.56 | 1.64 | 1.55 | 1.49 | 1.61 |
| 42CH | SCH | 1.75 | 1.70 | 1.41 | 1.51 | 1.56 | 1.53 | 1.48 | 1.40 |
| 42CH | SLL | 2.09 | 1.65 | 1.67 | 1.60 | 1.48 | 1.42 | 1.37 | 1.40 |
| 42CH | SLH | 1.87 | 1.72 | 1.73 | 1.80 | 1.43 | 1.39 | 1.33 | 1.39 |
| 42CH | FRL | 1.24 | 1.51 | 1.28 | 1.29 | 1.29 | 1.25 | 1.22 | 1.23 |
| 42CH | FRH | 1.23 | 1.39 | 1.54 | 1.46 | 1.25 | 1.26 | 1.28 | 1.29 |
| 42CH | FCL | 1.39 | 1.45 | 1.69 | 1.51 | 1.48 | 1.33 | 1.22 | 1.40 |
| 42CH | FCH | .79 | .77 | 1.05 | 1.05 | 1.07 | 1.00 | .94 | 1.00 |
| 42CH | FLL | 1.50 | 1.46 | 1.61 | 1.43 | 1.27 | 1.30 | 1.25 | 1.39 |
| 42CH | FLH | 1.44 | 1.54 | 1.40 | 1.40 | 1.42 | 1.26 | 1.16 | 1.39 |
| 43CH | SRL | 1.30 | 1.25 | 1.21 | 1.19 | 1.34 | 1.31 | 1.10 | 1.03 |
| 43CH | SRH | 1.29 | 1.33 | 1.47 | 1.31 | 2.01 | 1.55 | 1.56 | 1.53 |
| 43CH | SCL | 1.33 | 1.21 | 1.11 | .96 | 1.13 | 1.29 | 1.20 | 1.15 |
| 43CH | SCH | 1.71 | 1.42 | 1.39 | 1.32 | 1.56 | 1.45 | 1.32 | 1.19 |
| 43CH | SLL | .91 | .89 | .88 | 1.01 | .93 | 1.32 | 1.01 | .77 |
| 43CH | SLH | 1.18 | 1.27 | 1.39 | 1.44 | 1.85 | 1.31 | 1.42 | 1.59 |
| 43CH | FRL | 1.55 | 1.23 | 1.15 | 1.32 | 1.52 | 1.12 | 1.26 | 1.37 |
| 43CH | FRH | 1.20 | 1.26 | 1.37 | 1.41 | 1.42 | 1.20 | 1.25 | 1.31 |
| 43CH | FCL | 1.19 | 1.00 | .92 | .76 | 1.66 | 1.54 | 1.39 | 1.35 |
| 43CH | FCH | 1.03 | 1.00 | 1.03 | .89 | 1.05 | 1.27 | 1.12 | 1.10 |
| 43CH | FLL | 1.25 | 1.26 | 1.02 | 1.28 | 1.32 | 1.37 | 1.35 | 1.30 |
| 43CH | FLH | 1.36 | 1.32 | 1.30 | 1.17 | 1.18 | 1.20 | 1.50 | 1.61 |
| 44CH | SRL | 1.30 | 1.29 | 1.45 | 1.50 | 1.69 | 1.16 | 1.06 | 1.29 |
| 44CH | SRH | 1.40 | 1.30 | 1.76 | 1.59 | 1.52 | 1.60 | 1.55 | 1.48 |
| 44CH | SCL | 1.21 | 1.13 | 1.39 | 1.24 | 1.06 | 1.39 | 1.25 | 1.19 |
| 44CH | SCH | 1.70 | 1.68 | 1.06 | 1.15 | 1.39 | 1.53 | 1.66 | 1.24 |
| 44CH | SLL | 1.45 | 1.48 | 1.23 | 1.26 | 1.30 | 1.27 | 1.45 | 1.17 |
| 44CH | SLH | 1.40 | 1.35 | 1.57 | 1.46 | 1.44 | 1.48 | 1.38 | 1.04 |
| 44CH | FRL | 1.37 | 1.37 | 1.39 | 1.35 | 1.31 | 1.02 | 1.03 | 1.25 |
| 44CH | FRH | 1.45 | 1.46 | 1.43 | 1.30 | 1.29 | 1.12 | 1.13 | 1.08 |
| 44CH | FCL | 1.23 | 1.25 | 1.21 | 1.25 | 1.27 | 1.08 | 1.07 | 1.25 |
| 44CH | FCH | 1.60 | 1.66 | 1.16 | 1.24 | 1.12 | 1.43 | 1.43 | 1.36 |
| 44CH | FLL | 1.21 | 1.25 | 1.23 | 1.41 | 1.41 | 1.16 | 1.42 | 1.15 |
| 44CH | FLH | 1.65 | 1.63 | 1.50 | 1.40 | 1.30 | 1.24 | 1.28 | 1.25 |

## RAW SCORES--MOVEMENT TIME (CONT'D)

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 45CH | SRL | 1.45 | 1.50 | 1.82 | 1.61 | 1.47 | 1.58 | 1.38 | 1.42 |
| 45CH | SRH | 1.59 | 1.69 | 1.40 | 1.40 | 1.40 | 1.40 | 1.57 | 1.34 |
| 45CH | SCL | 1.35 | 1.57 | 1.54 | 1.46 | 1.50 | 1.45 | 1.41 | 1.15 |
| 45CH | SCH | 1.67 | 1.66 | 1.59 | 1.67 | 1.71 | 1.99 | 1.42 | 1.94 |
| 45CH | SLL | 1.20 | .95 | .94 | .95 | 1.00 | .95 | 1.15 | 1.10 |
| 45CH | SLH | 1.78 | 1.47 | 1.45 | 1.44 | 1.42 | 1.41 | 1.35 | 1.20 |
| 45CH | FRL | 1.96 | 1.78 | 1.90 | 1.63 | 1.74 | 1.52 | 1.62 | 1.41 |
| 45CH | FRH | 1.96 | 2.05 | 1.79 | 1.71 | 1.67 | 1.60 | 1.52 | 1.45 |
| 45CH | FCL | 1.36 | 1.89 | 1.69 | 1.56 | 1.50 | 1.44 | 1.48 | 1.65 |
| 45CH | FCH | 1.77 | 1.60 | 1.45 | 1.50 | 1.53 | 1.52 | 1.44 | 1.40 |
| 45CH | FLL | 1.88 | 1.81 | 1.89 | 1.85 | 1.76 | 1.70 | 1.86 | 1.58 |
| 45CH | FLH | 1.72 | 1.55 | 1.88 | 1.81 | 1.85 | 1.80 | 1.34 | 1.53 |
| 46CL | SRL | 1.14 | 1.23 | .97 | 1.18 | 1.26 | 1.38 | 1.40 | 1.20 |
| 46CL | SRH | .79 | 1.06 | .89 | .91 | 1.00 | 1.04 | 1.08 | 1.08 |
| 46CL | SCL | .54 | .55 | .87 | .96 | 1.01 | 1.07 | .87 | 1.18 |
| 46CL | SCH | 1.33 | 1.19 | 1.43 | 1.39 | 1.36 | 1.32 | .93 | 1.55 |
| 46CL | SLL | 1.08 | .82 | .92 | .97 | 1.05 | 1.07 | 1.10 | 1.18 |
| 46CL | SLH | 1.69 | 1.47 | 1.34 | 1.51 | 1.66 | 1.76 | 1.66 | 1.59 |
| 46CL | FRL | 1.58 | 1.75 | 1.49 | 1.50 | 1.62 | 1.88 | 1.56 | 1.57 |
| 46CL | FRH | 1.31 | 1.83 | 1.63 | 1.80 | 1.77 | 1.86 | 1.79 | 1.90 |
| 46CL | FCL | .83 | 1.16 | 1.37 | 1.34 | 1.23 | 1.20 | 1.62 | 1.51 |
| 46CL | FCH | 1.79 | 1.33 | 1.53 | 1.72 | 1.80 | 1.82 | 1.70 | 1.83 |
| 46CL | FLL | 1.58 | 1.42 | 1.35 | 1.40 | 1.44 | 1.55 | 1.68 | 1.87 |
| 46CL | FLH | 1.56 | 1.66 | 1.76 | 1.70 | 1.65 | 1.62 | 2.00 | 1.84 |
| 47CL | SRL | 1.80 | 1.39 | 1.31 | 1.45 | 1.87 | 1.39 | 1.43 | 1.52 |
| 47CL | SRH | 1.45 | 1.46 | 1.42 | 1.61 | 1.93 | 1.43 | 1.47 | 1.50 |
| 47CL | SCL | .48 | 1.31 | 1.23 | 1.10 | .49 | 1.49 | 1.20 | 1.04 |
| 47CL | SCH | .51 | 1.12 | 1.05 | 1.00 | .97 | 1.29 | 1.29 | 1.29 |
| 47CL | SLL | 1.86 | 1.56 | 1.36 | 1.30 | 1.19 | 1.05 | 1.00 | .90 |
| 47CL | SLH | 1.65 | 1.55 | 1.59 | 1.51 | .95 | 1.62 | 1.40 | 1.31 |
| 47CL | FRL | 1.02 | 1.60 | 1.74 | 1.52 | .97 | 1.93 | 1.87 | 1.93 |
| 47CL | FRH | 1.87 | 2.09 | 1.78 | 1.87 | 1.88 | 2.36 | 2.34 | 2.29 |
| 47CL | FCL | 1.94 | 1.83 | 2.32 | 2.00 | 1.93 | 1.93 | 2.00 | 2.01 |
| 49CL | FCH | 1.65 | 2.17 | 2.27 | 2.00 | 1.90 | 2.13 | 2.10 | 2.11 |
| 47CL | FLL | 1.63 | 1.53 | 1.78 | 1.75 | 1.75 | 1.65 | 1.80 | 1.95 |
| 47CL | FLH | 1.96 | 2.46 | 1.97 | 1.95 | 1.18 | 2.04 | 2.06 | 2.14 |
| 48CL | SRL | 1.02 | 1.09 | 1.07 | 1.07 | 1.05 | 1.05 | 1.04 | 1.07 |
| 48CL | SRH | 1.31 | .95 | 1.00 | 1.20 | 1.28 | 1.13 | 1.03 | 1.33 |
| 48CL | SCL | 1.26 | .88 | .75 | .67 | 1.00 | 1.00 | 1.03 | .82 |
| 48CL | SCH | .74 | .68 | .68 | .68 | .77 | .77 | .60 | .91 |
| 48CL | SLL | .90 | 1.33 | 1.27 | 1.30 | 1.00 | 1.10 | 1.07 | 1.06 |
| 48CL | SLH | 1.18 | 1.10 | 1.26 | 1.42 | 1.21 | 1.20 | 1.22 | .56 |
| 48CL | FRL | 1.08 | 1.12 | 1.23 | 1.26 | 1.19 | 1.23 | 1.25 | 1.40 |
| 48CL | FRH | 1.35 | 1.25 | 1.25 | 1.21 | 1.29 | 1.30 | 1.34 | 1.44 |
| 48CL | FCL | 1.32 | 1.03 | 1.16 | 1.33 | 1.30 | 1.27 | 1.05 | 1.06 |
| 48CL | FCH | 1.59 | 1.35 | 1.29 | 1.25 | 1.41 | 1.26 | 1.11 | 1.12 |
| 48CL | FLL | 1.34 | 1.27 | 1.25 | 1.23 | 1.30 | 1.25 | 1.23 | 1.26 |
| 48CL | FLH | 1.45 | 1.28 | 1.31 | 1.39 | 1.15 | 1.33 | 1.41 | 1.78 |

## RAW SCORES--MOVEMENT TIME (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 49CL | SRL | 2.02 | 1.61 | 1.74 | 1.74 | 1.75 | 1.74 | 1.78 | 1.76 |
| 49CL | SRH | 1.20 | 1.17 | 1.38 | 1.36 | 1.36 | 1.32 | 1.37 | 1.27 |
| 49CL | SCL | 1.66 | 1.97 | 1.53 | 2.22 | 1.79 | 1.81 | 1.80 | 1.87 |
| 49CL | SCH | .90 | 1.10 | 1.38 | 1.22 | 1.33 | 1.47 | 1.31 | 1.46 |
| 49CL | SLL | 1.76 | 1.83 | 1.99 | 2.02 | 2.09 | 2.06 | 2.01 | 2.05 |
| 49CL | SLH | 1.45 | 2.10 | 2.15 | 2.02 | 2.04 | 2.39 | 2.16 | 2.08 |
| 49CL | FRL | 1.26 | 1.79 | 1.36 | 1.71 | 1.96 | 1.27 | 1.21 | 1.23 |
| 49CL | FRH | 1.01 | 1.15 | 1.52 | 1.34 | 1.49 | 1.41 | 1.40 | 1.43 |
| 49CL | FCL | 1.34 | 1.28 | 1.53 | 1.60 | 1.17 | 1.23 | 1.20 | 1.36 |
| 49CL | FCH | .91 | 1.12 | 1.43 | 1.02 | .90 | 1.58 | 1.43 | 1.37 |
| 49CL | FLL | 1.33 | 1.60 | 1.64 | 1.91 | 1.82 | 1.92 | 1.80 | 1.86 |
| 49CL | FLH | 1.30 | 1.60 | 1.54 | 1.52 | 1.67 | 1.83 | 1.73 | 1.77 |
| 50CL | SRL | .91 | .96 | 1.17 | 1.16 | 1.38 | 1.17 | 1.15 | 1.16 |
| 50CL | SRH | 1.03 | 1.70 | 1.49 | 1.53 | 1.23 | 1.39 | 1.43 | 1.40 |
| 50CL | SCL | 1.17 | 1.32 | 1.71 | 1.17 | 1.27 | 1.25 | 1.27 | 1.25 |
| 50CL | SCH | .63 | 1.13 | 1.22 | 1.24 | 1.22 | 1.29 | 1.25 | 1.25 |
| 50CL | SLL | 1.27 | 1.53 | 1.47 | 1.40 | 1.63 | 1.48 | 1.5[illegible] | 1.46 |
| 50CL | SLH | 1.30 | 1.55 | 1.44 | 1.69 | 1.55 | 1.68 | 1.6[illegible] | 1.65 |
| 50CL | FRL | 1.17 | 1.23 | 1.51 | 1.60 | 1.50 | 1.59 | 1.6[illegible] | 1.60 |
| 50CL | FRH | 1.38 | 1.46 | 1.55 | 1.54 | 2.10 | 1.54 | 1.57 | 1.53 |
| 50CL | FCL | 1.91 | 1.67 | 2.08 | 2.08 | 1.98 | 2.07 | 2.1[illegible] | 2.09 |
| 50CL | FCH | 1.64 | 1.63 | 1.69 | 1.68 | 1.89 | 1.75 | 1.7[illegible] | 1.76 |
| 50CL | FLL | 1.28 | 1.56 | 1.69 | 1.29 | 1.74 | 2.01 | 1.8[illegible] | 1.76 |
| 50CL | FLH | 1.10 | 1.55 | 1.58 | 1.84 | 1.84 | 1.71 | 1.6[illegible] | 1.77 |
| 51CL | SRL | .94 | .77 | 1.28 | 1.06 | 1.53 | 1.33 | 1.3[illegible] | 1.26 |
| 51CL | SRH | 1.02 | .85 | .85 | .76 | .75 | .76 | .8[illegible] | .80 |
| 51CL | SCL | .91 | .94 | 1.26 | 1.31 | 1.21 | 1.14 | 1.1[illegible] | 1.17 |
| 51CL | SCH | 1.46 | 1.16 | 1.01 | 1.05 | 1.15 | 1.16 | 1.13 | 1.15 |
| 51CL | SLL | 1.43 | 1.51 | 1.71 | 1.71 | 1.48 | 1.84 | 1.75 | 1.73 |
| 51CL | SLH | 1.48 | 1.41 | 1.31 | 1.87 | 1.58 | 1.40 | 1.53 | 1.53 |
| 51CL | FRL | .77 | .87 | 1.65 | 1.79 | 1.32 | 1.59 | 1.65 | 1.72 |
| 51CL | FRH | 1.16 | 1.25 | .99 | 1.78 | 1.68 | 1.69 | 1.73 | 1.66 |
| 51CL | FCL | 1.12 | 1.60 | 1.60 | 1.80 | 2.05 | 1.43 | 1.61 | 1.65 |
| 51CL | FCH | 1.21 | 1.57 | 1.76 | 1.65 | 2.07 | 1.88 | 1.73 | 1.89 |
| 51CL | FLL | 1.64 | 1.48 | 1.95 | 1.57 | 1.50 | 2.13 | 1.75 | 2.00 |
| 51CL | FLH | 1.34 | 1.31 | 1.83 | 2.02 | 2.17 | 1.93 | 2.00 | 1.98 |
| 52CL | SRL | 1.19 | 1.06 | .77 | .98 | .90 | .88 | .90 | .91 |
| 52CL | SRH | 1.00 | .69 | 1.20 | .78 | .83 | .89 | .90 | .87 |
| 52CL | SCL | 1.00 | 1.21 | .91 | 1.12 | 1.07 | 1.06 | 1.00 | 1.09 |
| 52CL | SCH | 1.27 | .87 | 1.23 | .97 | .97 | .99 | .93 | 1.00 |
| 52CL | SLL | 1.21 | 1.32 | 1.24 | 1.35 | 1.41 | 1.11 | 1.31 | 1.30 |
| 52CL | SLH | 1.55 | 1.29 | 1.36 | 1.29 | 1.29 | .75 | 1.28 | 1.32 |
| 52CL | FRL | 1.23 | .72 | .81 | .74 | .74 | .82 | .82 | .83 |
| 52CL | FRH | .85 | .84 | .79 | .87 | .81 | .79 | .82 | .79 |
| 52CL | FCL | 1.06 | 1.14 | 1.15 | 1.12 | 1.32 | .70 | 1.06 | .99 |
| 52CL | FCH | 1.41 | 1.15 | 1.35 | 1.17 | 1.01 | 1.09 | 1.13 | 1.10 |
| 52CL | FLL | 1.35 | 1.00 | 1.34 | 1.32 | 1.23 | 1.21 | 1.[illegible]0 | 1.24 |
| 52CL | FLH | 1.21 | 1.35 | 1.11 | 1.23 | 1.20 | 1.27 | 1.[illegible]5 | 1.21 |

## RAW SCORES--MOVEMENT TIME (CONT'D)

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 53CL | SRL | .91 | 1.27 | 1.36 | 1.47 | 1.15 | 1.19 | 1.20 | 1.14 |
| 53CL | SRH | 1.09 | .92 | 1.00 | 1.08 | 1.20 | 1.16 | 1.05 | 1.06 |
| 53CL | SCL | .75 | .80 | .80 | .78 | 1.10 | .91 | .74 | .71 |
| 53CL | SCH | .47 | .62 | .63 | .70 | .74 | .61 | .52 | .46 |
| 53CL | SLL | .32 | .64 | .89 | 1.13 | .91 | 1.00 | 1.14 | 1.18 |
| 53CL | SLH | .60 | .86 | 1.01 | 1.07 | 1.25 | 1.13 | .88 | 1.17 |
| 53CL | FRL | 1.02 | 1.20 | 1.16 | 1.20 | 1.11 | 1.32 | 1.45 | 1.55 |
| 53CL | FRH | 1.19 | 1.11 | 1.28 | 1.31 | 1.18 | 1.28 | 1.29 | 1.38 |
| 53CL | FCL | 1.05 | .92 | .79 | .68 | 1.08 | 1.04 | 1.08 | 1.04 |
| 53CL | FCH | .92 | .99 | 1.06 | 1.19 | 1.31 | 1.24 | 1.26 | 1.27 |
| 53CL | FLL | .79 | .90 | 1.00 | 1.08 | 1.16 | 1.18 | 1.25 | 1.38 |
| 53CL | FLH | .84 | 1.23 | 1.25 | 1.21 | 1.37 | 1.31 | 1.27 | 1.60 |
| 54CL | SRL | 1.64 | 1.87 | 1.62 | 1.49 | 1.82 | 1.76 | 1.75 | 2.07 |
| 54CL | SRH | 1.49 | 1.48 | 1.39 | 1.32 | .81 | 1.38 | 1.08 | 1.48 |
| 54CL | SCL | .96 | 1.37 | 1.40 | 1.46 | 1.45 | 1.53 | 1.63 | 1.52 |
| 54CL | SCH | .94 | 1.49 | 1.06 | .96 | .80 | 1.16 | 1.37 | 1.29 |
| 54CL | SLL | 1.40 | 1.65 | 1.60 | 1.58 | 1.85 | 1.86 | 1.87 | 1.93 |
| 54CL | SLH | 1.42 | 1.52 | 1.60 | 1.62 | 1.54 | 1.59 | 1.68 | 1.62 |
| 54CL | FRL | .92 | 1.44 | 1.36 | 1.25 | 1.45 | 1.52 | 1.64 | 2.01 |
| 54CL | FRH | .80 | 1.95 | 1.81 | 1.74 | 2.12 | 1.90 | 1.91 | 1.90 |
| 54CL | FCL | 1.15 | 1.75 | 1.16 | 1.53 | 1.53 | 1.17 | 1.15 | 1.34 |
| 54CL | FCH | 1.15 | 1.62 | 1.27 | 1.16 | 1.26 | 1.25 | 1.28 | 1.63 |
| 54CL | FLL | 1.57 | 1.66 | 1.66 | 1.69 | 1.26 | 1.63 | 1.99 | 1.85 |
| 54CL | FLH | 1.66 | 1.72 | 1.60 | 1.45 | 1.76 | 1.67 | 2.08 | 1.72 |

## DEVIATION SCORES--DISTANCE

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 01JH | SRL | 22L | 0 | 8S | 21S | 1L | 12S | 5S | 10S |
| 01JH | SRH | 6L | 13L | 12L | 0 | 8S | 16S | 9S | 9S |
| 01JH | SCL | 12L | 0 | 0 | 1S | 17S | 4S | 32S | 8S |
| 01JH | SCH | 0 | 9L | 8L | 61L | 0 | 2S | 4L | 10S |
| 01JH | SLL | 18S | 0 | 3S | 0 | 3S | 0 | 2S | 3S |
| 01JH | SLH | 20L | 31L | 1L | 0 | 0 | 0 | 0 | 0 |
| 01JH | FRL | 0 | 0 | 0 | 12S | 6S | 37S | 43S | 14S |
| 01JH | FRH | 18L | 77L | 61L | 0 | 0 | 13L | 0 | 18S |
| 01JH | FCL | 0 | 0 | 40L | 0 | 16S | 32S | 6S | 12S |
| 01JH | FCH | 63L | 46L | 58L | 7L | 0 | 10L | 2L | 12S |
| 01JH | FLL | 12L | 11L | 0 | 7S | 24S | 6S | 4S | 9S |
| 01JH | FLH | 30L | 41L | 41L | 29S | 8S | 0 | 0 | 21S |
| 02JH | SRL | 0 | 4L | 19L | 17L | 33L | 28L | 12L | 16S |
| 02JH | SRH | 21L | 35L | 30L | 61L | 51L | 46L | 58L | 43L |
| 02JH | SCL | 5L | 17L | 10L | 27L | 8L | 20L | 15L | 15L |
| 02JH | SCH | 0 | 52L | 51L | 36L | 40L | 51L | 74L | 40L |
| 02JH | SLL | 2L | 55L | 35L | 22L | 45L | 40L | 53L | 35L |
| 02JH | SLH | 14L | 15L | 5L | 8L | 5L | 5L | 5L | 8L |
| 02JH | FRL | 61S | 71S | 69S | 108S | 110S | 126S | 67S | 71S |
| 02JH | FRH | 58S | 0 | 28S | 0 | 66S | 62S | 30S | 30S |
| 02JH | FCL | 43S | 42S | 62S | 107S | 79S | 96S | 54S | 62S |
| 02JH | FCH | 0 | 14L | 0 | 14S | 12S | 10S | 0 | 7S |
| 02JH | FLL | 46S | 44S | 68S | 103S | 74S | 73S | 69S | 68S |
| 02JH | FLH | 15S | 10S | 0 | 4S | 3S | 14S | 5S | 7S |
| 03JH | SRL | 23L | 0 | 7L | 10L | 0 | 23L | 0 | 16L |
| 03JH | SRH | 59L | 34L | 79L | 58L | 103L | 0 | 20L | 108L |
| 03JH | SCL | 0 | 0 | 0 | 0 | 0 | 1S | 0 | 7L |
| 03JH | SCH | 47L | 77L | 30L | 31L | 2S | 14L | 0 | 19L |
| 03JH | SLL | 6L | 13L | 0 | 6L | 14L | 0 | 0 | 15L |
| 03JH | SLH | 28L | 111L | 126L | 54L | 57L | 7L | 21L | 29L |
| 03JH | FRL | 99S | 59S | 0 | 62S | 52S | 111S | 49S | 65S |
| 03JH | FRH | 0 | 0 | 5L | 6L | 14L | 4L | 19L | 5L |
| 03JH | FCL | 67S | 8S | 0 | 29S | 52S | 73S | 0 | 5L |
| 03JH | FCH | 16L | 7L | 78L | 18L | 7S | 0 | 18L | 0 |
| 03JH | FLL | 0 | 0 | 12L | 0 | 5S | 0 | 28S | 5S |
| 03JH | FLH | 7L | 54L | 80L | 32L | 30L | 19L | 6L | 32L |
| 04JH | SRL | 41L | 40L | 14L | 17L | 3L | 13L | 0 | 8L |
| 04JH | SRH | 75L | 87L | 87L | 69L | 57L | 56L | 44L | 77L |
| 04JH | SCL | 38L | 1L | 14L | 8L | 0 | 0 | 0 | 4S |
| 04JH | SCH | 66L | 82L | 89L | 73L | 54L | 55L | 92L | 43L |
| 04JH | SLL | 60L | 5L | 22L | 0 | 0 | 23L | 0 | 0 |
| 04JH | SLH | 69L | 80L | 84L | 76L | 73S | 84L | 103L | 48L |
| 04JH | FRL | 41S | 23S | 2S | 33S | 92S | 63S | 8S | 0 |
| 04JH | FRH | 19S | 0 | 11L | 8L | 0 | 12L | 16L | 0 |
| 04JH | FCL | 10S | 40S | 12S | 16L | 43S | 21S | 0 | 0 |
| 04JH | FCH | 0 | 19L | 5L | 13L | 22L | 19L | 17S | 12S |
| 04JH | FLL | 26S | 59S | 8S | 22L | 7S | 17S | 35S | 0 |
| 04JH | FLH | 14S | 0 | 0 | 5L | 0 | 12L | 2L | 6L |

## DEVIATION SCORES--DISTANCE (CONT'D)

| SUB- JECT ID | CONDI- TION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 05JH | SRL | 19L | 0 | 3L | 0 | 0 | 0 | 0 | 0 |
| 05JH | SRH | 24L | 79L | 42L | 0 | 45L | 55L | 10L | 36L |
| 05JH | SCL | 0 | 0 | 0 | 3S | 18S | 0 | 0 | 0 |
| 05JH | SCH | 32L | 31L | 64L | 0 | 4L | 109L | 19L | 27L |
| 05JH | SLL | 5L | 14L | 3L | 13L | 28L | 15S | 0 | 11L |
| 05JH | SLH | 32L | 9L | 44L | 28L | 63L | 14L | 39L | 32L |
| 05JH | FRL | 0 | 5S | 35S | 30S | 10L | 14L | 12L | 14L |
| 05JH | FRH | 15L | 27L | 0 | 14S | 19S | 0 | 0 | 11L |
| 05JH | FCL | 5L | 7L | 5S | 60S | 76S | 16S | 99S | 6L |
| 05JH | FCH | 28L | 28L | 6L | 26S | 0 | 0 | 0 | 12S |
| 05JH | FLL | 20S | 9S | 42S | 10L | 25S | 43S | 9S | 22S |
| 05JH | FLH | 0 | 0 | 1L | 6S | 4S | 0 | 0 | 0 |
| 06JH | SRL | 16L | 24S | 0 | 0 | 0 | 6S | 0 | 0 |
| 06JH | SRH | 14S | 7S | 0 | 5S | 5S | 0 | 23L | 7L |
| 06JH | SCL | 27S | 0 | 21S | 6L | 7L | 17L | 31L | 16L |
| 06JH | SCH | 8L | 1L | 35L | 31L | 64L | 59L | 73L | 38L |
| 06JH | SLL | 11S | 0 | 0 | 20S | 0 | 0 | 0 | 0 |
| 06JH | SLH | 40S | 0 | 12S | 7S | 0 | 0 | 4S | 9S |
| 06JH | FRL | 27L | 13L | 13L | 39S | 0 | 8S | 4S | 15S |
| 06JH | FRH | 86L | 46L | 50L | 27L | 29L | 31L | 39L | 34L |
| 06JH | FCL | 11L | 46L | 8L | 0 | 0 | 0 | 0 | 0 |
| 06JH | FCH | 61L | 97L | 63L | 53L | 76L | 46L | 43L | 63L |
| 06JH | FLL | 10L | 29L | 0 | 18L | 0 | 0 | 0 | 8L |
| 06JH | FLH | 41L | 28L | 65L | 0 | 66L | 58L | 62L | 52L |
| 07JH | SRL | 4L | 4L | 5L | 0 | 0 | 0 | 13S | 17S |
| 07JH | SRH | 49L | 13L | 16L | 38L | 4L | 0 | 3S | 5S |
| 07JH | SCL | 61L | 75L | 27L | 12L | 27L | 19S | 5S | 6S |
| 07JH | SCH | 4L | 0 | 4L | 5L | 6L | 9L | 2L | 0 |
| 07JH | SLL | 12L | 19L | 13L | 14L | 10S | 16S | 12S | 13S |
| 07JH | SLH | 43L | 9L | 23L | 44L | 29L | 0 | 38L | 2L |
| 07JH | FRL | 42S | 43S | 45L | 41S | 33S | 53S | 41S | 62S |
| 07JH | FRH | 27L | 0 | 7L | 0 | 4S | 0 | 8L | 10L |
| 07JH | FCL | 26S | 18S | 8L | 0 | 0 | 6S | 0 | 6S |
| 07JH | FCH | 4L | 2S | 0 | 0 | 0 | 0 | 4L | 0 |
| 07JH | FLL | 27S | 17S | 13S | 10S | 19S | 7S | 0 | 10S |
| 07JH | FLH | 5L | 19L | 0 | 0 | 0 | 0 | 0 | 0 |
| 08JH | SRL | 14L | 0 | 5L | 0 | 3L | 6L | 0 | 10L |
| 08JH | SRH | 18L | 33L | 20L | 7L | 34L | 36L | 9L | 18L |
| 08JH | SCL | 57L | 59L | 30L | 0 | 0 | 0 | 39L | 46L |
| 08JH | SCH | 69L | 89L | 65L | 88L | 7L | 55L | 62L | 83L |
| 08JH | SLL | 11L | 6L | 10L | 23L | 0 | 0 | 14L | 19L |
| 08JH | SLH | 87L | 17L | 19L | 47L | 73L | 22L | 12L | 16L |
| 08JH | FRL | 100S | 111S | 107S | 52S | 144S | 109S | 122S | 110S |
| 08JH | FRH | 81S | 78S | 54S | 91S | 89S | 54S | 38S | 35S |
| 08JH | FCL | 95S | 56S | 92S | 80S | 119S | 118S | 82S | 97S |
| 08JH | FCH | 74S | 50S | 50S | 31S | 34S | 50S | 69S | 94S |
| 08JH | FLL | 86S | 100S | 103S | 73S | 129S | 92S | 125S | 116S |
| 08JH | FLH | 61S | 70S | 70S | 42S | 108S | 113S | 68S | 31S |

## DEVIATION SCORES--DISTANCE (CONT'D)

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 09JH | SRL | 48L | 22L | 33L | 16L | 12L | 24L | 24L | 23L |
| 09JH | SRH | 76L | 59L | 111L | 68L | 75L | 75L | 70L | 65L |
| 09JH | SCL | 2S | 23L | 8L | 10L | 8L | 11L | 3L | 23L |
| 09JH | SCH | 64L | 98L | 102L | 87L | 106L | 85L | 65L | 76L |
| 09JH | SLL | 16L | 52L | 27L | 57L | 34L | 37L | 10L | 63L |
| 09JH | SLH | 91L | 89L | 83L | 99L | 67L | 79L | 90L | 38L |
| 09JH | FRL | 4S | 44S | 62S | 47S | 33S | 41L | 25S | 76S |
| 09JH | FRH | 0 | 4L | 1L | 0 | 23S | 8L | 0 | 27S |
| 09JH | FCL | 9S | 0 | 10L | 9S | 5S | 6S | 5S | 4S |
| 09JH | FCH | 7L | 3L | 7L | 1S | 3L | 4L | 8L | 0 |
| 09JH | FLL | 51S | 7L | 0 | 0 | 16S | 16S | 16S | 34S |
| 09JH | FLH | 0 | 50L | 20L | 25S | 18S | 18S | 2L | 0 |
| 10JL | SRL | 4L | 0 | 0 | 14S | 20L | 14S | 56S | 54S |
| 10JL | SRH | 42L | 11L | 0 | 34L | 10L | 26L | 8S | 4S |
| 10JL | SCL | 30L | 0 | 0 | 0 | 0 | 0 | 10S | 0 |
| 10JL | SCH | 41L | 16L | 38L | 154L | 37L | 91L | 3L | 37L |
| 10JL | SLL | 6S | 0 | 0 | 42S | 26S | 23S | 61L | 61S |
| 10JL | SLH | 22L | 0 | 31L | 128L | 31L | 6L | 0 | 44L |
| 10JL | FRL | 104S | 68S | 24S | 38S | 63S | 25S | 146S | 40S |
| 10JL | FRH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36S |
| 10JL | FCL | 17S | 5S | 21S | 0 | 24S | 78S | 39S | 11S |
| 10JL | FCH | 1L | 0 | 15L | 0 | 0 | 0 | 2L | 0 |
| 10JL | FLL | 45S | 58S | 10S | 0 | 45S | 37S | 116S | 98S |
| 10JL | FLH | 9S | 40S | 8S | 0 | 0 | 10L | 0 | 3L |
| 11JL | SRL | 75L | 45L | 23L | 0 | 125L | 36L | 48L | 12S |
| 11JL | SRH | 8L | 33L | 33L | 153L | 20S | 41S | 153L | 57L |
| 11JL | SCL | 0 | 13L | 17L | 0 | 0 | 117L | 117L | 13S |
| 11JL | SCH | 12L | 13L | 14L | 7L | 135L | 0 | 0 | 146L |
| 11JL | SLL | 6L | 0 | 0 | 0 | 3L | 0 | 31S | 35S |
| 11JL | SLH | 0 | 0 | 0 | 10L | 0 | 2L | 146L | 53L |
| 11JL | FRL | 154S | 128S | 118S | 130S | 156S | 93S | 50S | 177S |
| 11JL | FRH | 153S | 121S | 120S | 12S | 164S | 157S | 176S | 32S |
| 11JL | FCL | 37S | 38S | 37S | 168S | 204S | 170S | 51S | 14S |
| 11JL | FCH | 0 | 62S | 160S | 155L | 16S | 166S | 1S | 0 |
| 11JL | FLL | 174S | 184S | 184S | 182S | 192S | 176S | 184S | 223S |
| 11JL | FLH | 169S | 94S | 144S | 155S | 172S | 51S | 36S | 160S |
| 12JL | SRL | 36L | 41L | 54L | 24L | 28L | 70L | 37L | 36L |
| 12JL | SRH | 91L | 82L | 136L | 124L | 16L | 38L | 20L | 38L |
| 12JL | SCL | 64L | 161L | 102L | 36L | 2L | 0 | 0 | 61L |
| 12JL | SCH | 8L | 31L | 147L | 56L | 23L | 28L | 25L | 65L |
| 12JL | SLL | 56L | 45L | 47L | 40L | 40L | 30L | 7L | 49L |
| 12JL | SLH | 69L | 80L | 139L | 154L | 90L | 82L | 100L | 87L |
| 12JL | FRL | 69S | 12S | 4S | 34S | 34S | 37S | 82S | 56L |
| 12JL | FRH | 10S | 0 | 0 | 7S | 19S | 26S | 6S | 12S |
| 12JL | FCL | 10S | 7S | 0 | 81S | 59S | 150S | 17S | 9S |
| 12JL | FCH | 26S | 0 | 0 | 0 | 2S | 0 | 41S | 0 |
| 12JL | FLL | 67S | 66S | 20S | 65S | 86S | 70S | 64S | 80S |
| 12JL | FLH | 0 | 44S | 17L | 12S | 81S | 32S | 43S | 46S |

## DEVIATION SCORES--DISTANCE (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 13JL | SRL | 26L | 58L | 0 | 10L | 41S | 26S | 26S | 12S |
| 13JL | SRH | 28L | 35L | 38L | 78L | 0 | 2L | 0 | 2S |
| 13JL | SCL | 0 | 0 | 9L | 0 | 0 | 0 | 0 | 45S |
| 13JL | SCH | 29L | 21L | 31L | 58L | 8L | 31L | 119L | 24L |
| 13JL | SLL | 16L | 28L | 5L | 0 | 0 | 29S | 1S | 14S |
| 13JL | SLH | 69L | 51L | 134L | 36L | 39L | 12L | 112L | 10L |
| 13JL | FRL | 120S | 154S | 48S | 119S | 26S | 162S | 45S | 72S |
| 13JL | FRH | 35S | 124S | 35S | 0 | 3S | 18S | 13S | 0 |
| 13JL | FCL | 49S | 53S | 0 | 0 | 94S | 62S | 24S | 26S |
| 13JL | FCH | 11S | 2L | 0 | 3S | 20L | 18L | 27L | 0 |
| 13JL | FLL | 72S | 65S | 59S | 22S | 119S | 5S | 34S | 16S |
| 13JL | FLH | 39S | 16S | 92S | 25S | 0 | 48S | 15S | 0 |
| 14JL | SRL | 68L | 25L | 34L | 0 | 12L | 20L | 7S | 0 |
| 14JL | SRH | 119L | 67L | 28L | 17L | 2L | 39L | 0 | 32L |
| 14JL | SCL | 83L | 31L | 47L | 0 | 0 | 62L | 2L | 8L |
| 14JL | SCH | 155L | 76L | 55L | 0 | 26L | 102L | 192L | 132L |
| 14JL | SLL | 57L | 10L | 5L | 0 | 12S | 11L | 0 | 7L |
| 14JL | SLH | 126L | 46L | 31L | 63L | 211L | 32L | 12L | 10L |
| 14JL | FRL | 68S | 125S | 123S | 61S | 53S | 98S | 45S | 66S |
| 14JL | FRH | 25S | 107S | 29S | 128S | 45S | 37S | 23S | 10S |
| 14JL | FCL | 60S | 61S | 144S | 37S | 28S | 54S | 38S | 39S |
| 14JL | FCH | 11S | 83S | 0 | 95S | 22S | 21S | 7S | 3S |
| 14JL | FLL | 46S | 52S | 62S | 96S | 73S | 49S | 54S | 22S |
| 14JL | FLH | 15S | 4S | 0 | 110S | 107S | 42S | 48S | 0 |
| 15JL | SRL | 5L | 0 | 34L | 0 | 0 | 19L | 27L | 27L |
| 15JL | SRH | 41L | 46L | 54L | 73L | 67L | 56L | 110L | 80L |
| 15JL | SCL | 18L | 92L | 6L | 98L | 0 | 9L | 9L | 6S |
| 15JL | SCH | 155L | 160L | 175L | 126L | 185L | 121L | 55L | 69L |
| 15JL | SLL | 23L | 7L | 43L | 101L | 14L | 36L | 9L | 19L |
| 15JL | SLH | 88L | 113L | 138L | 108L | 119L | 115L | 95L | 102L |
| 15JL | FRL | 0 | 133S | 40S | 29S | 76S | 67S | 85S | 37S |
| 15JL | FRH | 9S | 21S | 44L | 0 | 3L | 10S | 0 | 0 |
| 15JL | FCL | 0 | 19S | 23L | 10S | 34S | 19S | 0 | 12S |
| 15JL | FCH | 19L | 0 | 20L | 6L | 0 | 15L | 14L | 0 |
| 15JL | FLL | 4L | 0 | 0 | 0 | 9S | 10L | 37S | 28S |
| 15JL | FLH | 8L | 2S | 10L | 3L | 0 | 7L | 8L | 0 |
| 16JL | SRL | 143S | 30L | 38L | 27L | 0 | 0 | 34S | 37L |
| 16JL | SRH | 35L | 17L | 47L | 52L | 59L | 26L | 13S | 29L |
| 16JL | SCL | 0 | 0 | 0 | 9L | 27L | 0 | 10S | 7L |
| 16JL | SCH | 48L | 33L | 28L | 19L | 13S | 25S | 0 | 30L |
| 16JL | SLL | 0 | 47L | 49L | 0 | 0 | 13S | 3S | 45L |
| 16JL | SLH | 9L | 3L | 64L | 5L | 0 | 2L | 15L | 9L |
| 16JL | FRL | 120S | 57S | 70S | 37S | 143S | 144S | 59S | 126S |
| 16JL | FRH | 0 | 6S | 0 | 28S | 26S | 115S | 60S | 43S |
| 16JL | FCL | 22S | 39S | 62S | 166S | 41S | 0 | 27L | 39S |
| 17JL | FCH | 26S | 27S | 9S | 154S | 174S | 153S | 115L | 120S |
| 16JL | FLL | 22S | 42S | 16S | 19S | 66S | 209S | 101S | 124S |
| 16JL | FLH | 0 | 10S | 1L | 22S | 0 | 2S | 11S | 9S |

## DEVIATION SCORES--DISTANCE (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 17JL | SRL | 25L | 4L | 106L | 68L | 47L | 37L | 0 | 0 |
| 17JL | SRH | 79L | 44L | 90L | 71L | 140L | 47L | 146L | 77L |
| 17JL | SCL | 65L | 41L | 18L | 36L | 24L | 107L | 11L | 180S |
| 17JL | SCH | 87L | 18L | 62L | 80L | 131L | 168L | 56L | 38L |
| 17JL | SLL | 42L | 0 | 0 | 78L | 74L | 0 | 11L | 42L |
| 17JL | SLH | 98L | 42L | 65L | 155L | 150L | 80L | 44L | 44L |
| 17JL | FRL | 5S | 167S | 0 | 0 | 0 | 22S | 7S | 0 |
| 17JL | FRH | 10S | 28S | 21L | 7L | 22L | 24L | 23L | 20L |
| 17JL | FCL | 15S | 48S | 0 | 2L | 0 | 1S | 24S | 0 |
| 17JL | FCH | 20S | 33S | 12L | 41L | 18L | 26L | 9L | 15L |
| 17JL | FLL | 0 | 0 | 0 | 0 | 0 | 10S | 12S | 24S |
| 17JL | FLH | 75S | 81S | 0 | 15L | 30L | 0 | 71L | 30L |
| 18JL | SRL | 8S | 0 | 0 | 0 | 0 | 13L | 19L | 2L |
| 18JL | SRH | 3L | 19L | 0 | 0 | 25L | 14L | 36L | 31L |
| 18JL | SCL | 0 | 0 | 0 | 0 | 0 | 0 | 2L | 0 |
| 18JL | SCH | 16L | 21L | 11L | 15L | 0 | 5L | 105L | 26L |
| 18JL | SLL | 3L | 22L | 14L | 57L | 65L | 0 | 0 | 22L |
| 18JL | SLH | 68L | 40L | 27L | 42L | 49L | 44L | 39L | 27L |
| 18JL | FRL | 44S | 75S | 22S | 0 | 70S | 126S | 72S | 90S |
| 18JL | FRH | 48L | 50L | 33L | 65L | 119S | 12S | 0 | 0 |
| 18JL | FCL | 88S | 76S | 29L | 15L | 171S | 53S | 31S | 170S |
| 18JL | FCH | 102L | 65L | 55L | 9L | 20S | 17S | 5L | 35S |
| 18JL | FLL | 100S | 95L | 0 | 50S | 57S | 29S | 81S | 111S |
| 18JL | FLH | 19L | 61L | 45L | 66L | 25S | 0 | 47S | 0 |
| 19HH | SRL | 61L | 53L | 48L | 57L | 0 | 9L | 34L | 9L |
| 19HH | SRH | 146L | 68L | 94L | 10L | 33L | 69L | 64L | 30L |
| 19HH | SCL | 88L | 55L | 0 | 0 | 0 | 0 | 20L | 0 |
| 19HH | SCH | 165L | 149L | 67L | 24L | 17L | 0 | 62L | 12L |
| 19HH | SLL | 17L | 41L | 39L | 23L | 15L | 14L | 23L | 11L |
| 19HH | SLH | 143L | 72L | 39L | 70L | 57L | 15L | 64L | 51L |
| 19HH | FRL | 66L | 46L | 29L | 44S | 18S | 12S | 36S | 40S |
| 19HH | FRH | 75L | 22L | 54L | 0 | 0 | 1L | 22L | 0 |
| 19HH | FCL | 70L | 0 | 41L | 28S | 84S | 16S | 43S | 64S |
| 19HH | FCH | 66L | 62L | 0 | 0 | 3L | 4L | 21L | 12L |
| 19HH | FLL | 21L | 31L | 3L | 25S | 16S | 0 | 16S | 15S |
| 19HH | FLH | 62L | 35L | 38L | 32L | 30L | 24L | 39L | 54L |
| 20HH | SRL | 52L | 57L | 39L | 0 | 0 | 12S | 0 | 19L |
| 20HH | SRH | 72L | 58L | 54L | 0 | 1L | 0 | 4L | 26L |
| 20HH | SCL | 36L | 33L | 28L | 0 | 0 | 0 | 2S | 52L |
| 20HH | SCH | 110L | 66L | 89L | 36L | 35L | 26L | 0 | 41L |
| 20HH | SLL | 57L | 63L | 88L | 41L | 20L | 18L | 0 | 55L |
| 20HH | SLH | 105L | 111L | 77L | 66L | 9L | 18L | 0 | 26S |
| 20HH | FRL | 11S | 5S | 0 | 44S | 38S | 33S | 27S | 23S |
| 20HH | FRH | 3L | 0 | 17L | 22S | 13S | 7S | 0 | 3S |
| 20HH | FCL | 0 | 2S | 0 | 6S | 22S | 20S | 14S | 9S |
| 20HH | FCH | 19L | 36L | 0 | 0 | 0 | 0 | 0 | 7L |
| 20HH | FLL | 37S | 5S | 0 | 42S | 42S | 46S | 12S | 26S |
| 20HH | FLH | 20L | 0 | 10L | 34S | 0 | 1L | 0 | 0 |

DEVIATION SCORES--DISTANCE (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 21HH | SRL | 27L | 39L | 66L | 59L | 0 | 0 | 27S | 0 |
| 21HH | SRH | 40L | 50L | 76L | 3L | 34L | 38L | 12L | 50L |
| 21HH | SCL | 13L | 49L | 8L | 24L | 0 | 0 | 9S | 0 |
| 21HH | SCH | 53L | 36L | 41L | 14L | 0 | 21L | 1S | 0 |
| 21HH | SLL | 44L | 25L | 33L | 31L | 19L | 0 | 2L | 0 |
| 21HH | SLH | 73L | 40L | 103L | 73L | 0 | 3L | 25L | 0 |
| 21HH | FRL | 0 | 29S | 27S | 19S | 69S | 77S | 8S | 0 |
| 21HH | FRH | 133L | 52L | 36L | 0 | 0 | 17L | 40L | 40L |
| 21HH | FCL | 0 | 0 | 36L | 12L | 0 | 17L | 0 | 9L |
| 21HH | FCH | 92L | 66L | 81L | 26L | 31L | 82L | 65L | 76L |
| 21HH | FLL | 14L | 23L | 33L | 41L | 37S | 23S | 4L | 12L |
| 21HH | FLH | 32L | 21L | 27L | 60L | 50L | 4L | 64L | 0 |
| 22HH | SRL | 13L | 26L | 24L | 0 | 9L | 0 | 0 | 0 |
| 22HH | SRH | 16L | 27L | 34L | 49L | 131L | 44L | 69L | 25L |
| 22HH | SCL | 39L | 17L | 0 | 63L | 11L | 0 | 0 | 3L |
| 22HH | SCH | 0 | 13L | 22L | 18L | 16L | 54L | 15L | 20L |
| 22HH | SLL | 8L | 13L | 24L | 17L | 13L | 20L | 0 | 8L |
| 22HH | SLH | 12L | 48L | 40L | 38L | 81L | 28L | 42L | 21L |
| 22HH | FRL | 0 | 80S | 0 | 12L | 0 | 1L | 0 | 0 |
| 22HH | FRH | 0 | 5S | 36L | 0 | 30L | 31L | 33L | 19L |
| 22HH | FCL | 0 | 34S | 7S | 0 | 16L | 9L | 5L | 0 |
| 22HH | FCH | 61L | 61L | 45L | 0 | 19L | 52L | 36L | 11L |
| 22HH | FLL | 0 | 21L | 25L | 15S | 9L | 0 | 0 | 3L |
| 22HH | FLH | 28L | 30L | 0 | 48L | 33L | 44L | 18L | 23L |
| 23HH | SRL | 30L | 3S | 14L | 4L | 9S | 32S | 0 | 19L |
| 23HH | SRH | 22L | 24L | 20L | 2L | 12L | 33L | 16L | 25L |
| 23HH | SCL | 2L | 0 | 8L | 0 | 9S | 31S | 15L | 0 |
| 23HH | SCH | 6L | 4S | 13L | 29L | 0 | 9L | 10L | 23L |
| 23HH | SLL | 12L | 26L | 12L | 4L | 0 | 9L | 8S | 27L |
| 23HH | SLH | 7L | 14L | 29L | 23L | 23L | 80L | 0 | 56L |
| 23HH | FRL | 35S | 17S | 20S | 28S | 32S | 7S | 11S | 14S |
| 23HH | FRH | 53L | 54L | 23L | 30L | 0 | 0 | 12L | 8L |
| 23HH | FCL | 0 | 0 | 15S | 15S | 12S | 36S | 14S | 32S |
| 23HH | FCH | 36L | 28L | 13L | 2L | 0 | 28L | 0 | 0 |
| 23HH | FLL | 0 | 17S | 45S | 2S | 24S | 21S | 26S | 49S |
| 23HH | FLH | 6L | 0 | 20L | 53L | 9S | 50L | 0 | 26L |
| 24HH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7S |
| 24HH | SRH | 13L | 16L | 31L | 25L | 46L | 0 | 0 | 0 |
| 24HH | SCL | 41L | 12L | 0 | 36L | 0 | 0 | 8S | 0 |
| 24HH | SCH | 27L | 13L | 29L | 0 | 36L | 0 | 9L | 0 |
| 24HH | SLL | 0 | 0 | 0 | 0 | 36L | 0 | 0 | 0 |
| 24HH | SLH | 12L | 0 | 0 | 0 | 0 | 0 | 6L | 30L |
| 24HH | FRL | 0 | 54L | 13S | 38S | 95S | 47S | 88S | 100S |
| 24HH | FRH | 14L | 14L | 18L | 0 | 20S | 27S | 22S | 0 |
| 24HH | FCL | 1L | 26L | 0 | 52S | 26S | 37S | 36S | 29S |
| 24HH | FCH | 50L | 0 | 0 | 0 | 0 | 0 | 0 | 12S |
| 24HH | FLL | 14S | 39L | 52S | 55S | 42S | 28S | 43S | 41S |
| 24HH | FLH | 0 | 16L | 46S | 8S | 48S | 0 | 1S | 3L |

## DEVIATION SCORES--DISTANCE (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 25HH | SRL | 0 | 0 | 26S | 23S | 5S | 0 | 1S | 8L |
| 25HH | SRH | 14L | 11L | 6S | 14S | 4L | 19S | 16L | 9L |
| 25HH | SCL | 0 | 17S | 15S | 14S | 0 | 5S | 13S | 31S |
| 25HH | SCH | 17S | 14S | 55L | 19S | 0 | 0 | 10L | 14S |
| 25HH | SLL | 0 | 18S | 32S | 22S | 0 | 0 | 0 | 0 |
| 25HH | SLH | 0 | 0 | 0 | 17S | 13L | 0 | 0 | 0 |
| 25HH | FRL | 109S | 0 | 75S | 55S | 119S | 42S | 134S | 68S |
| 25HH | FRH | 22S | 129S | 30S | 0 | 0 | 0 | 0 | 49S |
| 25HH | FCL | 40S | 77S | 28S | 70S | 0 | 28S | 1S | 35S |
| 25HH | FCH | 91S | 18S | 0 | 0 | 11S | 0 | 24S | 0 |
| 25HH | FLL | 77S | 50S | 79S | 8S | 78S | 36S | 48S | 24S |
| 25HH | FLH | 2S | 74S | 0 | 0 | 23S | 14S | 0 | 0 |
| 26HH | SRL | 34L | 6L | 12L | 4L | 1L | 2L | 0 | 8L |
| 26HH | SRH | 0 | 26L | 41L | 25L | 20L | 37L | 38L | 23L |
| 26HH | SCL | 19L | 15L | 4L | 0 | 0 | 0 | 0 | 0 |
| 26HH | SCH | 37L | 60L | 65L | 11L | 39L | 41L | 25L | 27L |
| 26HH | SLL | 12L | 33L | 17L | 14L | 62L | 0 | 0 | 0 |
| 26HH | SLH | 24L | 26L | 5L | 21L | 28L | 28L | 21L | 16L |
| 26HH | FRL | 29L | 27L | 16L | 0 | 86S | 31S | 2S | 24S |
| 26HH | FRH | 52L | 33L | 30L | 0 | 11L | 0 | 31L | 21L |
| 26HH | FCL | 1S | 0 | 0 | 0 | 0 | 8S | 22L | 5S |
| 26HH | FCH | 95L | 32S | 60L | 0 | 0 | 14L | 70L | 0 |
| 26HH | FLL | 58L | 40L | 15L | 13S | 7S | 5S | 26S | 23S |
| 26HH | FLH | 7S | 86L | 15L | 0 | 23L | 3L | 0 | 19L |
| 27HH | SRL | 32L | 24L | 0 | 0 | 4L | 11L | 1S | 7S |
| 27HH | SRH | 23L | 80L | 17L | 48L | 0 | 0 | 0 | 20L |
| 27HH | SCL | 63L | 16L | 20L | 37L | 0 | 0 | 0 | 0 |
| 27HH | SCH | 59L | 52L | 39L | 51L | 40L | 28L | 25L | 16L |
| 27HH | SLL | 82L | 63L | 0 | 3L | 0 | 22L | 0 | 6S |
| 27HH | SLH | 116L | 117L | 48L | 53L | 40L | 24L | 68L | 66L |
| 27HH | FRL | 12S | 0 | 52S | 53S | 37S | 32S | 65S | 49S |
| 27HH | FRH | 11L | 10L | 0 | 38L | 16L | 43L | 36L | 28L |
| 27HH | FCL | 30L | 10L | 0 | 2L | 0 | 8S | 0 | 7L |
| 27HH | FCH | 41L | 53L | 50L | 17L | 25L | 33L | 56L | 40L |
| 27HH | FLL | 0 | 0 | 0 | 2S | 0 | 2L | 15L | 2L |
| 27HH | FLH | 48L | 68L | 0 | 39L | 35L | 40L | 18L | 35L |
| 28HL | SRL | 88L | 92L | 114L | 71L | 60L | 72L | 59L | 13L |
| 28HL | SRH | 88L | 97L | 164L | 127L | 112L | 65L | 68L | 56L |
| 28HL | SCL | 56L | 69L | 81L | 62L | 76L | 32L | 74L | 43L |
| 28HL | SCH | 82L | 126L | 124L | 153L | 116L | 140L | 104L | 145L |
| 28HL | SLL | 94L | 69L | 73L | 110L | 96L | 52L | 64L | 26L |
| 28HL | SLH | 101L | 123L | 127L | 154L | 131L | 112L | 129L | 110L |
| 28HL | FRL | 16S | 97S | 0 | 62S | 79S | 58S | 76S | 75S |
| 28HL | FRH | 0 | 12S | 0 | 29L | 19S | 0 | 13S | 21S |
| 28HL | FCL | 83S | 7S | 39S | 0 | 45S | 63S | 38S | 38S |
| 28HL | FCH | 0 | 76S | 4S | 29S | 0 | 13S | 114S | 0 |
| 28HL | FLL | 79S | 12S | 22S | 53S | 50S | 26S | 45S | 41S |
| 28HL | FLH | 0 | 0 | 13S | 87S | 5L | 0 | 2S | 0 |

## DEVIATION SCORES--DISTANCE (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 29HL | SRL | 0 | 21L | 29L | 26L | 42L | 34L | 30L | 29L |
| 29HL | SRH | 60L | 45L | 41L | 28L | 60L | 23L | 38L | 30L |
| 29HL | SCL | 0 | 36L | 16L | 25L | 14L | 9L | 12L | 17L |
| 29HL | SCH | 0 | 33L | 56L | 45L | 31L | 24L | 38L | 35L |
| 29HL | SLL | 25L | 41L | 48L | 55L | 39L | 36L | 39L | 29L |
| 29HL | SLH | 36L | 64L | 48L | 74L | 57L | 66L | 59L | 52L |
| 29HL | FRL | 90S | 113S | 121S | 108S | 127S | 124S | 115S | 106S |
| 29HL | FRH | 58S | 37S | 58S | 16S | 83S | 66S | 78S | 72S |
| 29HL | FCL | 128S | 123S | 59S | 101S | 119S | 129S | 77S | 74S |
| 29HL | FCH | 90S | 83S | 30S | 65S | 52S | 108S | 55S | 34S |
| 29HL | FLL | 108S | 92S | 102S | 99S | 105S | 108S | 114S | 92S |
| 29HL | FLH | 81S | 63S | 52S | 68S | 74S | 64S | 65S | 40S |
| 30HL | SRL | 45L | 74L | 51L | 115L | 76L | 93L | 97L | 60L |
| 30HL | SRH | 120L | 71L | 130L | 206L | 126L | 140L | 67L | 107L |
| 30HL | SCL | 66L | 5L | 122L | 21L | 100L | 63L | 98L | 53L |
| 30HL | SCH | 182L | 162L | 164L | 162L | 48L | 122L | 115L | 136L |
| 30HL | SLL | 113L | 112L | 120L | 134L | 138L | 128L | 97L | 120L |
| 30HL | SLH | 130L | 165L | 30L | 127L | 199L | 107L | 100L | 185L |
| 30HL | FRL | 32S | 23S | 8L | 94S | 18S | 7S | 0 | 0 |
| 30HL | FRH | 32L | 22L | 16L | 15L | 0 | 7L | 27L | 0 |
| 30HL | FCL | 28L | 9L | 0 | 22L | 0 | 0 | 13S | 6S |
| 30HL | FCH | 20L | 65L | 30L | 39L | 33L | 33L | 18L | 23S |
| 30HL | FLL | 20S | 0 | 7S | 0 | 21S | 48S | 0 | 74S |
| 30HL | FLH | 21L | 19L | 17L | 78L | 12L | 8L | 0 | 0 |
| 31HL | SRL | 93L | 102L | 44L | 50L | 2L | 44L | 60L | 0 |
| 31HL | SRH | 84L | 172L | 127L | 125L | 72L | 44L | 60L | 47L |
| 31HL | SCL | 20L | 17L | 32L | 26L | 10L | 57L | 0 | 0 |
| 31HL | SCH | 136L | 51L | 182L | 96L | 116L | 59L | 35L | 10L |
| 31HL | SLL | 36L | 43L | 20L | 87L | 0 | 0 | 0 | 26L |
| 31HL | SLH | 195L | 116L | 82L | 45L | 94L | 30L | 27L | 27L |
| 31HL | FRL | 17S | 0 | 27S | 0 | 35S | 39S | 12S | 9S |
| 31HL | FRH | 27L | 5L | 28L | 0 | 0 | 9L | 0 | 0 |
| 31HL | FCL | 11S | 28S | 17L | 0 | 60S | 42S | 11S | 6L |
| 31HL | FCH | 56L | 39L | 18L | 0 | 0 | 33L | 24L | 0 |
| 31HL | FLL | 11L | 16L | 0 | 14S | 29S | 18S | 32S | 23S |
| 31HL | FLH | 65L | 54L | 58L | 0 | 29L | 26L | 0 | 0 |
| 32HL | SRL | 71L | 44L | 0 | 3L | 26L | 23L | 24L | 29L |
| 32HL | SRH | 138L | 89L | 30L | 17L | 60L | 41L | 5L | 96L |
| 32HL | SCL | 20L | 18L | 6L | 0 | 0 | 0 | 5S | 0 |
| 32HL | SCH | 56L | 19L | 31L | 12L | 33L | 37L | 38L | 20L |
| 32HL | SLL | 0 | 16L | 17L | 17L | 10L | 21L | 19L | 25L |
| 32HL | SLH | 125L | 52L | 105L | 0 | 66L | 20L | 29L | 14L |
| 32HL | FRL | 121S | 96S | 68S | 105S | 120S | 120S | 115S | 94S |
| 32HL | FRH | 53S | 29S | 41S | 60S | 82S | 61S | 65S | 87S |
| 32HL | FCL | 74S | 71S | 44S | 171S | 87S | 66S | 107S | 79S |
| 32HL | FCH | 40S | 44S | 15S | 50S | 33S | 52S | 14S | 12S |
| 32HL | FLL | 22S | 83S | 77S | 66S | 91S | 107S | 88S | 81S |
| 32HL | FLH | 42S | 61S | 60S | 65S | 50S | 121S | 51S | 25S |

DEVIATION SCORES--DISTANCE (CONT'D)

| SUB- JECT ID | CONDI- TION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 33HL | SRL | 145L | 127L | 138L | 144L | 164L | 138L | 136L | 158L |
| 33HL | SRH | 148L | 197L | 208L | 187L | 185L | 188L | 188L | 185L |
| 33HL | SCL | 136L | 63L | 139L | 113L | 109L | 114L | 115L | 116L |
| 33HL | SCH | 67L | 203L | 178L | 182L | 240L | 164L | 219L | 203L |
| 33HL | SLL | 45L | 135L | 155L | 110L | 108L | 88L | 124L | 118L |
| 33HL | SLH | 173L | 187L | 237L | 166L | 140L | 169L | 182L | 173L |
| 33HL | FRL | 0 | 7S | 0 | 0 | 1S | 0 | 0 | 0 |
| 33HL | FRH | 0 | 18L | 23L | 6S | 0 | 0 | 0 | 2L |
| 33HL | FCL | 0 | 0 | 0 | 0 | 0 | 0 | 21S | 20S |
| 33HL | FCH | 14L | 23L | 26L | 19L | 15L | 7L | 3L | 25L |
| 33HL | FLL | 45S | 67S | 7S | 37S | 26S | 48S | 43S | 25S |
| 33HL | FLH | 8L | 46S | 0 | 12S | 0 | 0 | 0 | 30S |
| 34HL | SRL | 52L | 7L | 9L | 0 | 0 | 0 | 0 | 9L |
| 34HL | SRH | 68L | 24L | 0 | 10L | 31L | 22L | 18L | 21L |
| 34HL | SCL | 12L | 0 | 0 | 12L | 0 | 0 | 0 | 0 |
| 34HL | SCH | 35L | 43L | 3L | 12L | 15L | 21L | 5L | 9L |
| 34HL | SLL | 74L | 3L | 24L | 33L | 19L | 26L | 0 | 1L |
| 34HL | SLH | 75L | 36L | 39L | 44L | 15L | 62L | 27L | 199L |
| 34HL | FRL | 112S | 115S | 145S | 149S | 211S | 172S | 154S | 173S |
| 34HL | FRH | 88S | 124S | 116S | 128S | 120S | 144S | 98S | 144S |
| 34HL | FCL | 130S | 176S | 183S | 169S | 176S | 176L | 152S | 157S |
| 34HL | FCH | 137S | 120S | 149S | 160S | 120S | 156S | 158S | 151S |
| 34HL | FLL | 122S | 143S | 161S | 135S | 149S | 150S | 140S | 161S |
| 34HL | FLH | 77S | 101S | 120S | 126S | 116S | 124S | 126S | 140S |
| 35HL | SRL | 63L | 4L | 27L | 30L | 45L | 20L | 0 | 28L |
| 35HL | SRH | 83L | 162L | 96L | 17L | 89L | 41L | 115L | 65L |
| 35HL | SCL | 65L | 32L | 34L | 36L | 26L | 17L | 0 | 0 |
| 35HL | SCH | 86L | 172L | 26L | 125L | 128L | 74L | 54L | 28L |
| 35HL | SLL | 87L | 32L | 36L | 77L | 60L | 72L | 3L | 0 |
| 35HL | SLH | 136L | 30L | 47L | 84L | 125L | 88L | 90L | 74L |
| 35HL | FRL | 67S | 46S | 0 | 39S | 159S | 89S | 65S | 71S |
| 35HL | FRH | 11L | 0 | 3L | 10S | 40S | 20S | 0 | 0 |
| 35HL | FCL | 0 | 0 | 16S | 17S | 33S | 12S | 30S | 20S |
| 35HL | FCH | 0 | 0 | 0 | 18L | 8S | 0 | 0 | 0 |
| 35HL | FLL | 0 | 41S | 18S | 62S | 83S | 106S | 91S | 94S |
| 35HL | FLH | 37L | 32S | 16L | 2S | 60S | 67S | 13S | 29S |
| 36HL | SRL | 108L | 66L | 15L | 0 | 7L | 18L | 31L | 1L |
| 36HL | SRH | 22L | 33L | 28L | 30L | 24L | 36L | 41L | 42L |
| 36HL | SCL | 93L | 0 | 13L | 0 | 0 | 0 | 0 | 2L |
| 36HL | SCH | 5L | 156L | 67L | 36L | 107L | 20L | 94L | 10L |
| 36HL | SLL | 18L | 17L | 9L | 12L | 0 | 6L | 0 | 0 |
| 36HL | SLH | 76L | 133L | 54L | 142L | 41L | 63L | 58L | 43L |
| 36HL | FRL | 62S | 76S | 76S | 66S | 93S | 58S | 98S | 79S |
| 36HL | FRH | 61S | 38S | 0 | 12S | 45S | 65S | 59S | 24S |
| 36HL | FCL | 0 | 67S | 44S | 132S | 74S | 116S | 77S | 28S |
| 36HL | FCH | 34S | 31S | 0 | 3L | 25S | 12S | 159S | 9L |
| 36HL | FLL | 73S | 52S | 46S | 131S | 79S | 121S | 65S | 68S |
| 36HL | FLH | 29S | 0 | 29S | 56S | 26S | 38S | 29S | 0 |

## DEVIATION SCORES--DISTANCE (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 37CH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 37CH | SRH | 10L | 13S | 27L | 23L | 10L | 10L | 9L | 62L |
| 37CH | SCL | 3S | 7L | 10L | 6L | 0 | 7L | 0 | 20L |
| 37CH | SCH | 28L | 25L | 27L | 44L | 85L | 46L | 25L | 78L |
| 37CH | SLL | 0 | 0 | 10S | 8L | 21L | 10L | 21L | 0 |
| 37CH | SLH | 34L | 15L | 37L | 35L | 65L | 41L | 45L | 31L |
| 37CH | FRL | 85S | 0 | 2S | 40S | 32S | 38S | 94S | 19S |
| 37CH | FRH | 14L | 22L | 49L | 33L | 54L | 34L | 34L | 28L |
| 37CH | FCL | 0 | 0 | 0 | 0 | 23L | 9S | 0 | 32S |
| 37CH | FCH | 40L | 66L | 64L | 65L | 53L | 75S | 62L | 70L |
| 37CH | FLL | 36S | 50S | 32S | 29L | 5L | 25S | 45S | 7L |
| 37CH | FLH | 0 | 1L | 6L | 25L | 42L | 29L | 51L | 61L |
| 38CH | SRL | 29L | 15L | 17L | 18L | 20L | 25L | 26L | 20L |
| 38CH | SRH | 31L | 50L | 50L | 80L | 95L | 57L | 95L | 70L |
| 38CH | SCL | 34L | 55L | 19L | 25L | 23L | 40L | 17L | 45L |
| 38CH | SCH | 40L | 43L | 12L | 52L | 58L | 40L | 75L | 41L |
| 38CH | SLL | 49L | 63L | 50L | 50L | 30L | 45L | 55L | 29L |
| 38CH | SLH | 40L | 65L | 60L | 63L | 69L | 57L | 60L | 60L |
| 38CH | FRL | 22S | 0 | 2S | 0 | 19S | 20S | 39S | 38S |
| 38CH | FRH | 8L | 24L | 1L | 6L | 3L | 8L | 5L | 7L |
| 38CH | FCL | 17L | 0 | 2S | 9L | 1L | 5L | 5L | 12L |
| 38CH | FCH | 26L | 25L | 38L | 38L | 44L | 36L | 31L | 48L |
| 38CH | FLL | 0 | 0 | 28S | 0 | 0 | 9S | 12S | 12S |
| 38CH | FLH | 33L | 14L | 22L | 20L | 18L | 38L | 48L | 46L |
| 39CH | SRL | 0 | 0 | 0 | 28L | 5L | 0 | 0 | 0 |
| 39CH | SRH | 2S | 3S | 0 | 0 | 0 | 0 | 0 | 0 |
| 39CH | SCL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 39CH | SCH | 25S | 15S | 18S | 0 | 21S | 28S | 15L | 0 |
| 39CH | SLL | 19S | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 39CH | SLH | 14S | 0 | 16S | 0 | 13L | 16S | 15L | 0 |
| 39CH | FRL | 6S | 17S | 0 | 0 | 0 | 0 | 1L | 4L |
| 39CH | FRH | 24L | 0 | 0 | 5L | 0 | 0 | 0 | 0 |
| 39CH | FCL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 39CH | FCH | 1L | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 39CH | FLL | 16S | 11S | 17S | 13S | 14S | 14S | 17S | 16S |
| 39CH | FLH | 0 | 29S | 22S | 19S | 20S | 11S | 15S | 19S |
| 40CH | SRL | 41L | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 40CH | SRH | 11L | 50L | 35L | 23L | 32L | 31L | 12L | 0 |
| 40CH | SCL | 10L | 0 | 3L | 0 | 6L | 0 | 0 | 0 |
| 40CH | SCH | 11L | 68L | 41L | 39L | 41L | 27L | 52L | 69L |
| 40CH | SLL | 23L | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 40CH | SLH | 11L | 17L | 29L | 56L | 31L | 49L | 35L | 0 |
| 40CH | FRL | 0 | 10S | 0 | 0 | 0 | 7L | 5L | 7L |
| 40CH | FRH | 18L | 51L | 9L | 56L | 41L | 0 | 0 | 58L |
| 40CH | FCL | 0 | 0 | 0 | 18L | 0 | 0 | 8L | 12L |
| 40CH | FCH | 30L | 36L | 75L | 32L | 52L | 44L | 57L | 65L |
| 40CH | FLL | 6S | 0 | 0 | 25L | 10L | 0 | 3L | 17L |
| 40CH | FLH | 27L | 0 | 27L | 7L | 11L | 6L | 6L | 4L |

## DEVIATION SCORES--DISTANCE (CONT'D)

| SUBJECT ID | CONDITION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 41CH | SRL | 0 | 0 | 10S | 0 | 0 | 0 | 0 | 0 |
| 41CH | SRH | 0 | 0 | 0 | 0 | 0 | 0 | 8S | 1L |
| 41CH | SCL | 6L | 0 | 5S | 1L | 10L | 3S | 16S | 10S |
| 41CH | SCH | 0 | 0 | 0 | 10L | 16S | 3L | 10L | 4L |
| 41CH | SLL | 0 | 11S | 0 | 8S | 10S | 15S | 24S | 11L |
| 41CH | SLH | 16L | 4S | 4S | 5S | 5S | 2S | 23S | 8S |
| 41CH | FRL | 13S | 14S | 12L | 8L | 0 | 5L | 0 | 0 |
| 41CH | FRH | 0 | 14L | 0 | 10L | 0 | 0 | 1L | 3L |
| 41CH | FCL | 4L | 0 | 8L | 0 | 0 | 2L | 0 | 1L |
| 41CH | FCH | 69L | 72L | 0 | 51L | 38L | 16L | 0 | 10L |
| 41CH | FLL | 0 | 21L | 0 | 9L | 4S | 7S | 0 | 5S |
| 41CH | FLH | 0 | 0 | 5L | 2L | 0 | 0 | 6L | 0 |
| 42CH | SRL | 17S | 20S | 12S | 15S | 19S | 8S | 6S | 13L |
| 42CH | SRH | 12S | 6S | 6S | 10S | 16S | 10S | 8S | 15S |
| 42CH | SCL | 20S | 0 | 16S | 8S | 2S | 3S | 6S | 0 |
| 42CH | SCH | 3S | 15S | 7S | 9S | 6S | 2S | 3S | 0 |
| 42CH | SLL | 22S | 0 | 21S | 10S | 13S | 9S | 8S | 14L |
| 42CH | SLH | 25S | 35S | 45S | 21S | 13S | 29S | 36S | 34S |
| 42CH | FRL | 8S | 8S | 16S | 7S | 6S | 8S | 6S | 6S |
| 42CH | FRH | 0 | 3S | 0 | 1S | 0 | 3S | 15S | 30S |
| 42CH | FCL | 7S | 24S | 1L | 10S | 6S | 8S | 0 | 15S |
| 42CH | FCH | 0 | 0 | 0 | 4S | 20S | 0 | 13S | 5S |
| 42CH | FLL | 24S | 0 | 0 | 0 | 5S | 7S | 0 | 5S |
| 42CH | FLH | 6S | 0 | 0 | 5S | 0 | 0 | 22S | 0 |
| 43CH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1L |
| 43CH | SRH | 0 | 7S | 15S | 7S | 0 | 36S | 15S | 6S |
| 43CH | SCL | 2S | 4L | 7L | 7L | 11L | 0 | 0 | 0 |
| 43CH | SCH | 0 | 14L | 29S | 16S | 13S | 0 | 20L | 15L |
| 43CH | SLL | 0 | 2L | 3L | 9S | 1L | 16L | 6L | 15L |
| 43CH | SLH | 13L | 21L | 30S | 15S | 0 | 0 | 12L | 14S |
| 43CH | FRL | 0 | 27S | 55S | 21S | 55S | 54S | 30S | 55S |
| 43CH | FRH | 12S | 10S | 0 | 0 | 5S | 21S | 16S | 0 |
| 43CH | FCL | 13S | 20S | 26S | 8S | 0 | 18S | 14S | 13S |
| 43CH | FCH | 14S | 15S | 29S | 14S | 17S | 22S | 30S | 28S |
| 43CH | FLL | 15S | 23S | 48S | 8S | 21S | 37S | 29S | 28S |
| 43CH | FLH | 6S | 7S | 11S | 12S | 15S | 35S | 10S | 15S |
| 44CH | SRL | 15L | 24L | 2L | 0 | 0 | 19L | 0 | 9L |
| 44CH | SRH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 44CH | SCL | 17L | 13L | 2L | 0 | 7L | 5L | 5L | 15L |
| 44CH | SCH | 0 | 1S | 10L | 5L | 9L | 24L | 3S | 4S |
| 44CH | SLL | 7L | 0 | 21L | 9L | 0 | 14L | 33L | 0 |
| 44CH | SLH | 15S | 1S | 12S | 6L | 11L | 0 | 11S | 26L |
| 44CH | FRL | 0 | 0 | 49S | 31S | 40S | 81S | 78S | 46S |
| 44CH | FRH | 26S | 32L | 70S | 15S | 20S | 68S | 0 | 56S |
| 44CH | FCL | 0 | 0 | 0 | 4S | 9S | 0 | 0 | 0 |
| 44CH | FCH | 47L | 63L | 0 | 22S | 34S | 20L | 0 | 50L |
| 44CH | FLL | 15S | 0 | 0 | 69S | 24S | 12L | 0 | 21S |
| 44CH | FLH | 0 | 63S | 7L | 10S | 17S | 0 | 62S | 0 |

## DEVIATION SCORES--DISTANCE (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 45CH | SRL | 15L | 0 | 3S | 7S | 0 | 13S | 0 | 0 |
| 45CH | SRH | 0 | 0 | 6L | 0 | 0 | 5L | 0 | 0 |
| 45CH | SCL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 45CH | SCH | 6L | 5L | 0 | 1L | 0 | 0 | 8S | 0 |
| 45CH | SLL | 0 | 0 | 3L | 0 | 6L | 12L | 0 | 12L |
| 45CH | SLH | 0 | 13L | 8L | 0 | 0 | 0 | 0 | 4S |
| 45CH | FRL | 33L | 12L | 36L | 21L | 15L | 56L | 39L | 0 |
| 45CH | FRH | 97L | 137L | 86L | 43L | 37L | 93L | 40L | 18L |
| 45CH | FCL | 15L | 14L | 5L | 12L | 7L | 14L | 3S | 16L |
| 45CH | FCH | 0 | 25L | 15L | 13L | 11L | 18L | 8L | 13L |
| 45CH | FLL | 3L | 15L | 21L | 8L | 15L | 23L | 10L | 43L |
| 45CH | FLH | 30L | 35L | 1L | 16L | 15L | 30L | 12L | 34L |
| 46CL | SRL | 6L | 15L | 23S | 20L | 30L | 21L | 19L | 29L |
| 46CL | SRH | 80L | 23L | 52L | 43L | 17L | 60L | 27L | 57L |
| 46CL | SCL | 0 | 0 | 0 | 13L | 0 | 0 | 18L | 8L |
| 46CL | SCH | 24L | 20L | 36L | 37L | 33L | 35L | 39L | 35L |
| 46CL | SLL | 27L | 21L | 10L | 12L | 25L | 25L | 5L | 17L |
| 46CL | SLH | 98L | 73L | 34L | 36L | 35L | 32L | 35L | 55L |
| 46CL | FRL | 44S | 111S | 35S | 40S | 40S | 45S | 7S | 39S |
| 46CL | FRH | 10S | 8S | 0 | 0 | 8S | 0 | 0 | 0 |
| 46CL | FCL | 94S | 60S | 27S | 0 | 15S | 0 | 6S | 3S |
| 46CL | FCH | 49S | 50S | 10S | 17S | 21S | 21L | 22L | 6L |
| 46CL | FLL | 34S | 53S | 28S | 28S | 23S | 19S | 23S | 11S |
| 46CL | FLH | 14S | 6S | 0 | 5S | 10S | 9S | 0 | 0 |
| 47CL | SRL | 74L | 50L | 40L | 66L | 95L | 68L | 60L | 67L |
| 47CL | SRH | 64L | 1S | 65L | 70L | 71L | 109L | 9L | 71L |
| 47CL | SCL | 24L | 20L | 19L | 30L | 34L | 24L | 30L | 35L |
| 47CL | SCH | 86L | 98L | 58L | 60L | 56L | 67L | 65L | 64L |
| 47CL | SLL | 104L | 47L | 36L | 50L | 50L | 67L | 40L | 30L |
| 47CL | SLH | 87L | 81L | 49L | 70L | 81L | 109L | 20L | 100L |
| 47CL | FRL | 94S | 46S | 4S | 18L | 27S | 14L | 10L | 12L |
| 47CL | FRH | 23L | 38L | 21L | 16L | 0 | 38L | 0 | 94L |
| 47CL | FCL | 3S | 0 | 18L | 7L | 11L | 0 | 5L | 16L |
| 47CL | FCH | 0 | 58L | 64L | 51L | 47L | 87L | 52L | 39L |
| 47CL | FLL | 12S | 2L | 9S | 6S | 3S | 0 | 5S | 17L |
| 47CL | FLH | 0 | 21L | 0 | 40L | 28S | 55L | 17L | 38L |
| 48CL | SRL | 43L | 38L | 36L | 17L | 38L | 27L | 25L | 40L |
| 48CL | SRH | 42L | 79L | 86L | 91L | 49L | 52L | 112L | 85L |
| 48CL | SCL | 10L | 76L | 43L | 38L | 0 | 0 | 29L | 16L |
| 48CL | SCH | 69L | 59L | 71L | 88L | 98L | 76L | 85L | 61L |
| 48CL | SLL | 20L | 36L | 16L | 28L | 12L | 14L | 10L | 29L |
| 48CL | SLH | 61L | 86L | 83L | 108L | 61L | 41L | 37L | 104L |
| 48CL | FRL | 92S | 81S | 67S | 14S | 54S | 51S | 47S | 12S |
| 48CL | FRH | 50S | 25S | 22S | 12S | 10S | 0 | 0 | 29L |
| 48CL | FCL | 20S | 51S | 24S | 7S | 0 | 11S | 13S | 3S |
| 48CL | FCH | 0 | 4L | 0 | 0 | 9L | 0 | 0 | 0 |
| 48CL | FLL | 39S | 75S | 52S | 43S | 41S | 21S | 50L | 3S |
| 48CL | FLH | 0 | 32S | 27S | 0 | 7S | 10S | 0 | 33L |

## DEVIATION SCORES--DISTANCE (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 49CL | SRL | 48S | 81S | 77S | 69S | 72S | 77S | 60S | 71S |
| 49CL | SRH | 0 | 33S | 66S | 47S | 0 | 40S | 54S | 61S |
| 49CL | SCL | 80S | 107S | 75S | 84S | 97S | 71S | 82S | 87S |
| 49CL | SCH | 0 | 12S | 19S | 46S | 0 | 0 | 17S | 0 |
| 49CL | SLL | 77S | 85S | 82S | 69S | 39S | 76S | 71S | 66S |
| 49CL | SLH | 41S | 0 | 7S | 10S | 0 | 53S | 41S | 26S |
| 49CL | FRL | 158S | 219S | 161S | 251S | 136S | 190S | 177S | 127S |
| 49CL | FRH | 46S | 136S | 136S | 111S | 80S | 127S | 183S | 146S |
| 49CL | FCL | 175S | 150S | 102S | 22S | 160S | 109S | 93S | 86S |
| 49CL | FCH | 43S | 129S | 93S | 135S | 0 | 20S | 119S | 98S |
| 49CL | FLL | 75S | 135S | 161S | 209S | 163S | 160S | 146S | 133S |
| 49CL | FLH | 51S | 122S | 130S | 178S | 91S | 129S | 101S | 93S |
| 50CL | SRL | 32L | 0 | 0 | 32L | 0 | 0 | 0 | 0 |
| 50CL | SRH | 11L | 36L | 7L | 25L | 12L | 0 | 15L | 22L |
| 50CL | SCL | 3L | 4L | 0 | 0 | 14S | 0 | 10L | 5L |
| 50CL | SCH | 79L | 55L | 26L | 0 | 33L | 30L | 26L | 42L |
| 50CL | SLL | 68L | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 50CL | SLH | 59L | 183L | 24L | 0 | 23L | 8L | 18L | 22L |
| 50CL | FRL | 47S | 43S | 16S | 26S | 49S | 0 | 53S | 47S |
| 50CL | FRH | 51S | 32S | 23S | 0 | 0 | 51L | 46S | 26S |
| 50CL | FCL | 22S | 7S | 0 | 26L | 0 | 0 | 0 | 30L |
| 50CL | FCH | 29S | 0 | 0 | 0 | 25L | 29L | 33S | 29S |
| 50CL | FLL | 45S | 44S | 34S | 100S | 10S | 0 | 16S | 21S |
| 50CL | FLH | 73S | 27S | 0 | 20S | 33L | 16L | 22S | 36S |
| 51CL | SRL | 50L | 53L | 42L | 36L | 45L | 62L | 51L | 39L |
| 51CL | SRH | 64L | 97L | 85L | 34L | 112L | 41L | 66L | 56L |
| 51CH | SCL | 0 | 11L | 59L | 76L | 38L | 139L | 22L | 31L |
| 51CL | SCH | 8L | 60L | 137L | 118L | 118L | 179L | 108L | 100L |
| 51CL | SLL | 56L | 85L | 106L | 101L | 118L | 169L | 132L | 156L |
| 51CL | SLH | 108L | 34L | 115L | 184L | 154L | 88L | 103L | 133L |
| 51CL | FRL | 147S | 100S | 0 | 50S | 114S | 102S | 98S | 86S |
| 51CL | FRH | 104S | 6S | 54S | 19S | 19S | 0 | 35S | 39S |
| 51CL | FCL | 129S | 71S | 7S | 149S | 162S | 85S | 79S | 100S |
| 51CL | FCH | 12S | 0 | 0 | 68S | 127S | 4L | 15S | 0 |
| 51CL | FLL | 67S | 91S | 17S | 20S | 132S | 155S | 103S | 115S |
| 51CL | FLH | 88S | 31S | 4L | 102S | 117S | 100S | 108S | 116S |
| 52CL | SRL | 5L | 0 | 11L | 47L | 24L | 42L | 26L | 32L |
| 52CL | SRH | 43L | 78L | 30L | 55L | 91L | 52L | 43L | 41L |
| 52CL | SCL | 0 | 0 | 15L | 0 | 0 | 0 | 0 | 0 |
| 52CL | SCH | 32L | 120L | 48L | 23L | 52L | 18L | 36L | 45L |
| 52CL | SLL | 48L | 43L | 46L | 47L | 50L | 37L | 41L | 43L |
| 52CL | SLH | 62L | 38L | 42L | 40L | 88L | 76L | 72L | 65L |
| 52CL | FRL | 58S | 147S | 87S | 99S | 130S | 110S | 100S | 91S |
| 52CL | FRH | 73S | 150S | 79S | 80S | 65S | 72S | 86S | 78S |
| 52CL | FCL | 95S | 83S | 89S | 44S | 33S | 102S | 78S | 81S |
| 52CL | FCH | 99S | 71S | 0 | 58S | 26S | 62S | 50S | 57S |
| 52CL | FLL | 103S | 103S | 75S | 85S | 106S | 61S | 106S | 77S |
| 52CL | FLH | 67S | 31S | 60S | 80S | 55S | 63S | 51S | 75S |

# DEVIATION SCORES--DISTANCE (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS<br>1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 53CL | SRL | 55L | 63L | 67L | 68L | 55L | 59L | 58L | 64L |
| 53CL | SRH | 93L | 96L | 90L | 91L | 82L | 106L | 129L | 117L |
| 53CL | SCL | 41L | 46L | 50L | 47L | 48L | 57L | 65L | 98L |
| 53CL | SCH | 79L | 111L | 82L | 75L | 121L | 126L | 133L | 95L |
| 53CL | SLL | 87L | 69L | 71L | 65L | 85L | 83L | 81L | 97L |
| 53CL | SLH | 71L | 87L | 82L | 98L | 81L | 90L | 97L | 118L |
| 53CL | FRL | 85S | 55S | 60S | 58S | 14S | 36S | 0 | 60L |
| 53CL | FRH | 56S | 29S | 30S | 21S | 29S | 18S | 10S | 10S |
| 53CL | FCL | 24S | 75S | 42S | 26S | 24S | 42S | 42S | 40S |
| 53CL | FCH | 31S | 22S | 17S | 20S | 0 | 26S | 0 | 41L |
| 53CL | FLL | 56S | 55S | 61S | 64S | 51S | 43S | 25S | 50S |
| 53CL | FLH | 34S | 0 | 0 | 30S | 0 | 13S | 15L | 25L |
| 54CL | SRL | 25L | 24L | 20L | 16L | 0 | 0 | 0 | 0 |
| 54CL | SRH | 74L | 67L | 52L | 44L | 57L | 63L | 81L | 64L |
| 54CL | SCL | 42L | 11L | 13L | 7L | 0 | 0 | 0 | 0 |
| 54CL | SCH | 113L | 74L | 56L | 47L | 53L | 50L | 45L | 25L |
| 54CL | SLL | 67L | 20L | 52L | 64L | 25L | 18L | 0 | 23L |
| 54CL | SLH | 96L | 94L | 62L | 43L | 51L | 36L | 25L | 33L |
| 54CL | FRL | 95S | 67S | 70S | 64S | 19L | 39S | 60S | 57S |
| 54CL | FRH | 63S | 50S | 47S | 30S | 22S | 46S | 40S | 30L |
| 54CL | FCL | 88S | 58S | 71S | 60S | 71L | 41S | 0 | 32S |
| 54CL | FCH | 28S | 12S | 15S | 12S | 0 | 25S | 36L | 30S |
| 54CL | FLL | 77S | 49S | 58S | 51S | 50S | 47S | 44S | 0 |
| 54CL | FLH | 20S | 49S | 35S | 50S | 25S | 37S | 40S | 30S |

## DEVIATION SCORES--RADIAL ERROR

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 01JH | SRL | 22 | 0 | 8 | 21 | 11 | 12 | 5 | 10 |
| 01JH | SRH | 6 | 13 | 14 | 0 | 19 | 16 | 9 | 9 |
| 01JH | SCL | 43 | 0 | 7 | 1 | 26 | 4 | 32 | 8 |
| 01JH | SCH | 0 | 9 | 12 | 61 | 18 | 2 | 7 | 11 |
| 01JH | SLL | 20 | 11 | 3 | 0 | 3 | 0 | 10 | 5 |
| 01JH | SLH | 26 | 31 | 5 | 0 | 0 | 0 | 0 | 0 |
| 01JH | FRL | 14 | 12 | 7 | 12 | 17 | 46 | 43 | 17 |
| 01JH | FRH | 58 | 77 | 61 | 54 | 13 | 59 | 16 | 26 |
| 01JH | FCL | 21 | 15 | 41 | 0 | 39 | 43 | 6 | 18 |
| 01JH | FCH | 69 | 48 | 58 | 7 | 0 | 10 | 11 | 14 |
| 01JH | FLL | 16 | 22 | 23 | 7 | 24 | 13 | 17 | 14 |
| 01JH | FLH | 30 | 41 | 41 | 29 | 9 | 0 | 0 | 21 |
| 02JH | SRL | 0 | 18 | 19 | 17 | 33 | 28 | 12 | 16 |
| 02JH | SRH | 21 | 42 | 30 | 61 | 51 | 46 | 58 | 43 |
| 02JH | SCL | 10 | 17 | 10 | 27 | 8 | 20 | 15 | 15 |
| 02JH | SCH | 0 | 52 | 51 | 36 | 40 | 51 | 74 | 40 |
| 02JH | SLL | 2 | 56 | 35 | 22 | 45 | 41 | 58 | 36 |
| 02JH | SLH | 14 | 15 | 5 | 10 | 7 | 5 | 5 | 8 |
| 02JH | FRL | 61 | 71 | 69 | 110 | 115 | 127 | 75 | 73 |
| 02JH | FRH | 68 | 37 | 34 | 25 | 83 | 69 | 31 | 42 |
| 02JH | FCL | 43 | 42 | 63 | 107 | 99 | 96 | 54 | 63 |
| 02JH | FCH | 10 | 14 | 15 | 15 | 17 | 31 | 12 | 14 |
| 02JH | FLL | 47 | 44 | 68 | 103 | 74 | 73 | 69 | 68 |
| 02JH | FLH | 15 | 10 | 0 | 4 | 3 | 14 | 5 | 7 |
| 03JH | SRL | 23 | 0 | 7 | 10 | 0 | 23 | 0 | 16 |
| 03JH | SRH | 59 | 45 | 80 | 59 | 107 | 0 | 20 | 108 |
| 03JH | SCL | 5 | 0 | 0 | 0 | 1 | 0 | 0 | 7 |
| 03JH | SCH | 47 | 77 | 39 | 31 | 2 | 14 | 0 | 19 |
| 03JH | SLL | 6 | 13 | 0 | 9 | 14 | 28 | 0 | 27 |
| 03JH | SLH | 29 | 111 | 126 | 54 | 57 | 7 | 22 | 29 |
| 03JH | FRL | 106 | 60 | 27 | 67 | 80 | 112 | 50 | 67 |
| 03JH | FRH | 15 | 25 | 40 | 38 | 31 | 29 | 36 | 63 |
| 03JH | FCL | 67 | 8 | 11 | 29 | 52 | 73 | 0 | 6 |
| 03JH | FCH | 20 | 16 | 78 | 19 | 7 | 0 | 28 | 0 |
| 03JH | FLL | 10 | 0 | 12 | 0 | 15 | 28 | 0 | 5 |
| 03JH | FLH | 17 | 54 | 80 | 32 | 30 | 19 | 7 | 32 |
| 04JH | SRL | 41 | 40 | 14 | 17 | 3 | 13 | 0 | 8 |
| 04JH | SRH | 75 | 87 | 87 | 69 | 57 | 56 | 44 | 77 |
| 04JH | SCL | 38 | 10 | 14 | 8 | 0 | 0 | 8 | 4 |
| 04JH | SCH | 66 | 82 | 89 | 73 | 54 | 55 | 92 | 46 |
| 04JH | SLL | 60 | 5 | 22 | 9 | 20 | 29 | 10 | 12 |
| 04JH | SLH | 69 | 80 | 84 | 76 | 74 | 84 | 104 | 48 |
| 04JH | FRL | 41 | 23 | 2 | 33 | 92 | 63 | 8 | 8 |
| 04JH | FRH | 23 | 8 | 15 | 10 | 8 | 17 | 16 | 0 |
| 04JH | FCL | 10 | 49 | 23 | 18 | 43 | 22 | 0 | 6 |
| 04JH | FCH | 19 | 19 | 7 | 14 | 22 | 19 | 18 | 12 |
| 04JH | FLL | 26 | 59 | 8 | 25 | 8 | 34 | 48 | 15 |
| 04JH | FLH | 14 | 0 | 0 | 5 | 2 | 12 | 8 | 10 |

## DEVIATION SCORES--RADIAL ERROR (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 05JH | SRL | 19 | 0 | 30 | 12 | 42 | 0 | 0 | 12 |
| 05JH | SRH | 26 | 80 | 43 | 1 | 0 | 56 | 12 | 37 |
| 05JH | SCL | 4 | 23 | 0 | 3 | 18 | 0 | 1 | 4 |
| 05JH | SCH | 34 | 31 | 65 | 0 | 4 | 109 | 19 | 27 |
| 05JH | SLL | 7 | 14 | 4 | 20 | 28 | 17 | 6 | 12 |
| 05JH | SLH | 32 | 9 | 44 | 28 | 63 | 14 | 39 | 32 |
| 05JH | FRL | 11 | 11 | 48 | 31 | 21 | 21 | 12 | 20 |
| 05JH | FRH | 30 | 64 | 37 | 23 | 28 | 35 | 2 | 30 |
| 05JH | FCL | 30 | 36 | 10 | 60 | 80 | 17 | 99 | 12 |
| 05JH | FCH | 29 | 32 | 23 | 26 | 0 | 0 | 0 | 12 |
| 05JH | FLL | 24 | 9 | 42 | 10 | 25 | 43 | 9 | 22 |
| 05JH | FLH | 3 | 0 | 3 | 6 | 4 | 0 | 0 | 0 |
| 06JH | SRL | 16 | 24 | 0 | 0 | 0 | 6 | 0 | 0 |
| 06JH | SRH | 14 | 8 | 0 | 5 | 5 | 0 | 23 | 7 |
| 06JH | SCL | 27 | 0 | 21 | 0 | 7 | 0 | 31 | 16 |
| 06JH | SCH | 14 | 1 | 36 | 31 | 64 | 59 | 73 | 38 |
| 06JH | SLL | 52 | 14 | 9 | 36 | 18 | 31 | 35 | 27 |
| 06JH | SLH | 40 | 0 | 12 | 17 | 0 | 6 | 28 | 11 |
| 06JH | FRL | 27 | 13 | 13 | 39 | 8 | 8 | 6 | 15 |
| 06JH | FRH | 97 | 52 | 50 | 27 | 34 | 33 | 39 | 37 |
| 06JH | FCL | 11 | 48 | 15 | 3 | 0 | 0 | 0 | 0 |
| 06JH | FCH | 64 | 97 | 63 | 53 | 78 | 46 | 43 | 63 |
| 06JH | FLL | 19 | 35 | 17 | 18 | 12 | 29 | 0 | 14 |
| 06JH | FLH | 47 | 37 | 65 | 0 | 66 | 58 | 62 | 52 |
| 07JH | SRL | 4 | 5 | 5 | 0 | 0 | 0 | 13 | 17 |
| 07JH | SRH | 52 | 21 | 16 | 38 | 4 | 0 | 3 | 5 |
| 07JH | SCL | 61 | 75 | 27 | 12 | 27 | 19 | 5 | 6 |
| 07JH | SCH | 4 | 0 | 4 | 17 | 6 | 9 | 2 | 0 |
| 07JH | SLL | 12 | 19 | 13 | 14 | 10 | 18 | 12 | 13 |
| 07JH | SLH | 40 | 9 | 23 | 44 | 29 | 0 | 38 | 2 |
| 07JH | FRL | 52 | 52 | 50 | 45 | 40 | 53 | 42 | 70 |
| 07JH | FRH | 48 | 22 | 21 | 24 | 22 | 16 | 8 | 17 |
| 07JH | FCL | 26 | 18 | 8 | 0 | 0 | 6 | 0 | 6 |
| 07JH | FCH | 5 | 2 | 0 | 0 | 4 | 0 | 23 | 0 |
| 07JH | FLL | 28 | 17 | 13 | 10 | 19 | 7 | 0 | 10 |
| 07JH | FLH | 5 | 19 | 0 | 0 | 8 | 0 | 0 | 0 |
| 08JH | SRL | 14 | 0 | 5 | 0 | 3 | 6 | 0 | 10 |
| 08JH | SRH | 24 | 37 | 22 | 7 | 38 | 38 | 9 | 18 |
| 08JH | SCL | 59 | 59 | 30 | 0 | 0 | 0 | 39 | 46 |
| 08JH | SCH | 69 | 89 | 65 | 88 | 7 | 55 | 62 | 83 |
| 08JH | SLL | 14 | 6 | 10 | 23 | 10 | 0 | 14 | 19 |
| 08JH | SLH | 87 | 17 | 19 | 47 | 73 | 24 | 12 | 16 |
| 08JH | FRL | 102 | 115 | 111 | 56 | 151 | 112 | 132 | 118 |
| 08JH | FRH | 81 | 82 | 62 | 95 | 96 | 82 | 43 | 54 |
| 08JH | FCL | 95 | 56 | 92 | 80 | 122 | 118 | 82 | 99 |
| 08JH | FCH | 74 | 51 | 51 | 31 | 36 | 57 | 71 | 94 |
| 08JH | FLL | 86 | 100 | 103 | 73 | 129 | 92 | 125 | 116 |
| 08JH | FLH | 61 | 70 | 70 | 42 | 108 | 113 | 68 | 31 |

## DEVIATION SCORES--RADIAL ERROR (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 09JH | SRL | 48 | 22 | 33 | 16 | 12 | 24 | 24 | 26 |
| 09JH | SRH | 77 | 61 | 112 | 69 | 75 | 75 | 70 | 65 |
| 09JH | SCL | 2 | 23 | 8 | 10 | 8 | 11 | 3 | 26 |
| 09JH | SCH | 64 | 98 | 102 | 89 | 106 | 85 | 65 | 76 |
| 09JH | SLL | 16 | 56 | 29 | 61 | 34 | 37 | 10 | 63 |
| 09JH | SLH | 91 | 89 | 83 | 99 | 67 | 79 | 90 | 38 |
| 09JH | FRL | 25 | 50 | 63 | 47 | 33 | 43 | 27 | 77 |
| 09JH | FRH | 28 | 20 | 14 | 22 | 26 | 20 | 18 | 29 |
| 09JH | FCL | 11 | 6 | 10 | 13 | 12 | 9 | 18 | 4 |
| 09JH | FCH | 32 | 24 | 9 | 5 | 8 | 13 | 8 | 4 |
| 09JH | FLL | 53 | 14 | 12 | 0 | 16 | 16 | 16 | 34 |
| 09JH | FLH | 0 | 50 | 20 | 25 | 18 | 18 | 2 | 0 |
| 10JL | SRL | 17 | 0 | 0 | 14 | 20 | 41 | 56 | 54 |
| 10JL | SRH | 42 | 31 | 27 | 34 | 28 | 51 | 44 | 4 |
| 10JL | SCL | 56 | 0 | 0 | 0 | 0 | 0 | 10 | 0 |
| 10JL | SCH | 41 | 16 | 38 | 154 | 37 | 91 | 3 | 37 |
| 10JL | SLL | 6 | 12 | 3 | 45 | 33 | 23 | 62 | 67 |
| 10JL | SLH | 22 | 0 | 31 | 128 | 31 | 6 | 13 | 44 |
| 10JL | FRL | 104 | 68 | 25 | 45 | 67 | 25 | 146 | 51 |
| 10JL | FRH | 47 | 6 | 0 | 22 | 25 | 21 | 34 | 44 |
| 10JL | FCL | 34 | 12 | 21 | 0 | 26 | 86 | 39 | 11 |
| 10JL | FCH | 1 | 14 | 15 | 41 | 0 | 0 | 2 | 8 |
| 10JL | FLL | 45 | 58 | 10 | 23 | 45 | 37 | 117 | 98 |
| 10JL | FLH | 16 | 40 | 13 | 0 | 13 | 48 | 0 | 5 |
| 11JL | SRL | 75 | 45 | 23 | 2 | 131 | 36 | 48 | 16 |
| 11JL | SRH | 8 | 34 | 33 | 154 | 21 | 41 | 154 | 58 |
| 11JL | SCL | 0 | 13 | 17 | 3 | 1 | 117 | 118 | 13 |
| 11JL | SCH | 12 | 17 | 14 | 7 | 135 | 16 | 13 | 146 |
| 11JL | SLL | 14 | 0 | 0 | 19 | 3 | 0 | 31 | 35 |
| 11JL | SLH | 14 | 0 | 0 | 10 | 2 | 2 | 154 | 53 |
| 11JL | FRL | 154 | 130 | 120 | 133 | 157 | 94 | 69 | 178 |
| 11JL | FRH | 171 | 122 | 136 | 63 | 165 | 157 | 177 | 33 |
| 11JL | FCL | 37 | 38 | 37 | 168 | 204 | 171 | 51 | 14 |
| 11JL | FCH | 3 | 62 | 160 | 155 | 16 | 166 | 1 | 0 |
| 11JL | FLL | 174 | 184 | 184 | 182 | 192 | 178 | 184 | 224 |
| 11JL | FLH | 169 | 95 | 146 | 155 | 174 | 51 | 38 | 165 |
| 12JL | SRL | 36 | 41 | 54 | 24 | 28 | 71 | 37 | 36 |
| 12JL | SRH | 91 | 82 | 136 | 124 | 16 | 39 | 22 | 39 |
| 12JL | SCL | 64 | 161 | 102 | 36 | 2 | 0 | 1 | 61 |
| 12JL | SCH | 8 | 31 | 147 | 56 | 23 | 28 | 25 | 65 |
| 12JL | SLL | 56 | 45 | 47 | 40 | 40 | 30 | 7 | 49 |
| 12JL | SLH | 69 | 80 | 139 | 154 | 90 | 82 | 100 | 87 |
| 12JL | FRL | 81 | 45 | 16 | 48 | 53 | 53 | 84 | 67 |
| 12JL | FRH | 37 | 46 | 58 | 22 | 50 | 50 | 45 | 44 |
| 12JL | FCL | 10 | 7 | 0 | 90 | 60 | 150 | 17 | 9 |
| 12JL | FCH | 26 | 7 | 0 | 0 | 32 | 0 | 57 | 0 |
| 12JL | FLL | 67 | 66 | 20 | 65 | 86 | 70 | 64 | 80 |
| 12JL | FLH | 0 | 44 | 17 | 12 | 81 | 32 | 43 | 46 |

## DEVIATION SCORES--RADIAL ERROR (CONT'D)

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 13JL | SRL | 26 | 58 | 2 | 10 | 41 | 26 | 26 | 12 |
| 13JL | SRH | 30 | 59 | 41 | 84 | 3 | 2 | 0 | 4 |
| 13JL | SCL | 0 | 0 | 10 | 0 | 2 | 0 | 0 | 45 |
| 13JL | SCH | 29 | 21 | 31 | 58 | 9 | 31 | 120 | 25 |
| 13JL | SLL | 16 | 28 | 5 | 0 | 1 | 29 | 1 | 14 |
| 13JL | SLH | 69 | 51 | 134 | 36 | 39 | 12 | 112 | 10 |
| 13JL | FRL | 124 | 157 | 67 | 119 | 40 | 165 | 68 | 78 |
| 13JL | FRH | 53 | 132 | 70 | 69 | 30 | 56 | 17 | 6 |
| 13JL | FCL | 49 | 60 | 0 | 0 | 94 | 62 | 24 | 26 |
| 13JL | FCH | 11 | 4 | 0 | 3 | 20 | 18 | 27 | 4 |
| 13JL | FLL | 72 | 65 | 59 | 22 | 119 | 5 | 34 | 19 |
| 13JL | FLH | 39 | 44 | 92 | 27 | 0 | 48 | 15 | 0 |
| 14JL | SRL | 68 | 25 | 34 | 0 | 12 | 20 | 8 | 0 |
| 14JL | SRH | 119 | 67 | 28 | 17 | 2 | 39 | 0 | 32 |
| 14JL | SCL | 83 | 31 | 48 | 0 | 0 | 62 | 2 | 8 |
| 14JL | SCH | 155 | 76 | 55 | 0 | 27 | 102 | 192 | 132 |
| 14JL | SLL | 57 | 10 | 5 | 6 | 12 | 11 | 1 | 7 |
| 14JL | SLH | 126 | 47 | 31 | 63 | 211 | 32 | 12 | 10 |
| 14JL | FRL | 68 | 125 | 123 | 63 | 53 | 98 | 45 | 66 |
| 14JL | FRH | 26 | 112 | 60 | 130 | 47 | 40 | 32 | 13 |
| 14JL | FCL | 60 | 61 | 144 | 37 | 28 | 54 | 38 | 43 |
| 14JL | FCH | 17 | 90 | 22 | 95 | 22 | 27 | 13 | 3 |
| 14JL | FLL | 46 | 53 | 62 | 96 | 73 | 49 | 54 | 22 |
| 14JL | FLH | 17 | 11 | 25 | 110 | 107 | 43 | 48 | 21 |
| 15JL | SRL | 5 | 0 | 34 | 0 | 0 | 19 | 27 | 30 |
| 15JL | SRH | 41 | 46 | 54 | 78 | 67 | 56 | 110 | 80 |
| 15JL | SCL | 18 | 94 | 63 | 99 | 15 | 11 | 9 | 6 |
| 15JL | SCH | 155 | 160 | 175 | 130 | 185 | 121 | 55 | 70 |
| 15JL | SLL | 26 | 7 | 46 | 101 | 31 | 41 | 24 | 22 |
| 15JL | SLH | 88 | 113 | 138 | 108 | 122 | 115 | 95 | 102 |
| 15JL | FRL | 40 | 133 | 50 | 35 | 76 | 70 | 87 | 42 |
| 15JL | FRH | 15 | 34 | 50 | 34 | 38 | 23 | 43 | 6 |
| 15JL | FCL | 0 | 19 | 23 | 16 | 34 | 19 | 6 | 12 |
| 15JL | FCH | 19 | 0 | 20 | 6 | 6 | 15 | 21 | 0 |
| 15JL | FLL | 10 | 3 | 0 | 2 | 9 | 12 | 38 | 29 |
| 15JL | FLH | 51 | 2 | 19 | 3 | 44 | 11 | 8 | 0 |
| 16JL | SRL | 143 | 30 | 38 | 28 | 0 | 1 | 34 | 37 |
| 16JL | SRH | 35 | 17 | 47 | 52 | 59 | 26 | 13 | 29 |
| 16JL | SCL | 0 | 0 | 10 | 9 | 29 | 21 | 13 | 7 |
| 16JL | SCH | 48 | 33 | 28 | 22 | 13 | 26 | 0 | 30 |
| 16JL | SLL | 0 | 47 | 49 | 0 | 0 | 16 | 3 | 45 |
| 16JL | SLH | 9 | 3 | 64 | 5 | 17 | 2 | 22 | 9 |
| 16JL | FRL | 120 | 57 | 70 | 38 | 143 | 144 | 60 | 126 |
| 16JL | FRH | 50 | 31 | 25 | 43 | 43 | 115 | 68 | 53 |
| 16JL | FCL | 27 | 39 | 62 | 166 | 41 | 7 | 28 | 39 |
| 16JL | FCH | 31 | 32 | 9 | 154 | 174 | 153 | 117 | 120 |
| 16JL | FLL | 22 | 42 | 16 | 19 | 66 | 209 | 101 | 124 |
| 16JL | FLH | 0 | 17 | 1 | 22 | 0 | 2 | 15 | 9 |

## DEVIATION SCORES--RADIAL ERROR (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 17JL | SRL | 25 | 4 | 107 | 68 | 47 | 37 | 0 | 0 |
| 17JL | SRH | 83 | 50 | 92 | 75 | 142 | 47 | 147 | 77 |
| 17JL | SCL | 65 | 41 | 18 | 36 | 24 | 107 | 11 | 180 |
| 17JL | SCH | 87 | 18 | 62 | 80 | 131 | 168 | 56 | 38 |
| 17JL | SLL | 42 | 0 | 0 | 78 | 75 | 0 | 16 | 42 |
| 17JL | SLH | 98 | 42 | 65 | 155 | 150 | 80 | 45 | 44 |
| 17JL | FRL | 30 | 174 | 25 | 32 | 26 | 33 | 37 | 27 |
| 17JL | FRH | 41 | 53 | 50 | 34 | 51 | 35 | 29 | 30 |
| 17JL | FCL | 18 | 59 | 0 | 2 | 26 | 1 | 26 | 3 |
| 17JL | FCH | 20 | 33 | 12 | 41 | 18 | 26 | 9 | 17 |
| 17JL | FLL | 0 | 0 | 12 | 0 | 19 | 10 | 12 | 24 |
| 17JL | FLH | 76 | 81 | 0 | 28 | 33 | 14 | 77 | 32 |
| 18JL | SRL | 11 | 0 | 0 | 0 | 0 | 13 | 21 | 23 |
| 18JL | SRH | 22 | 25 | 29 | 16 | 33 | 21 | 36 | 35 |
| 18JL | SCL | 16 | 9 | 0 | 3 | 0 | 13 | 2 | 0 |
| 18JL | SCH | 24 | 21 | 11 | 16 | 0 | 9 | 105 | 26 |
| 18JL | SLL | 21 | 24 | 17 | 59 | 66 | 0 | 0 | 25 |
| 18JL | SLH | 68 | 40 | 27 | 42 | 49 | 44 | 40 | 27 |
| 18JL | FRL | 55 | 81 | 30 | 27 | 77 | 133 | 78 | 92 |
| 18JL | FRH | 87 | 61 | 47 | 75 | 120 | 36 | 37 | 45 |
| 18JL | FCL | 107 | 77 | 129 | 15 | 171 | 56 | 31 | 170 |
| 18JL | FCH | 108 | 68 | 110 | 10 | 20 | 17 | 5 | 40 |
| 18JL | FLL | 101 | 95 | 9 | 51 | 57 | 29 | 81 | 111 |
| 18JL | FLH | 20 | 61 | 45 | 66 | 25 | 0 | 47 | 0 |
| 19HH | SRL | 61 | 53 | 48 | 58 | 0 | 9 | 34 | 9 |
| 19HH | SRH | 146 | 68 | 94 | 10 | 33 | 69 | 64 | 30 |
| 19HH | SCL | 88 | 55 | 0 | 1 | 0 | 0 | 20 | 0 |
| 19HH | SCH | 165 | 149 | 67 | 24 | 17 | 0 | 62 | 12 |
| 19HH | SLL | 18 | 41 | 41 | 23 | 15 | 14 | 23 | 11 |
| 19HH | SLH | 148 | 72 | 40 | 70 | 58 | 15 | 64 | 51 |
| 19HH | FRL | 71 | 46 | 29 | 45 | 18 | 20 | 37 | 41 |
| 19HH | FRH | 78 | 38 | 54 | 24 | 35 | 11 | 30 | 13 |
| 19HH | FCL | 70 | 0 | 44 | 28 | 84 | 16 | 43 | 64 |
| 19HH | FCH | 67 | 62 | 27 | 0 | 3 | 21 | 23 | 12 |
| 19HH | FLL | 24 | 31 | 28 | 25 | 16 | 0 | 17 | 19 |
| 19HH | FLH | 62 | 35 | 42 | 33 | 30 | 24 | 39 | 54 |
| 20HH | SRL | 52 | 57 | 39 | 0 | 0 | 12 | 0 | 19 |
| 20HH | SRH | 72 | 58 | 54 | 0 | 1 | 0 | 4 | 26 |
| 20HH | SCL | 36 | 33 | 28 | 0 | 0 | 11 | 2 | 52 |
| 20HH | SCH | 112 | 66 | 90 | 36 | 35 | 26 | 0 | 41 |
| 20HH | SLL | 69 | 65 | 88 | 42 | 20 | 18 | 0 | 56 |
| 20HH | SLH | 105 | 112 | 77 | 66 | 9 | 18 | 0 | 26 |
| 20HH | FRL | 11 | 13 | 0 | 44 | 38 | 33 | 27 | 23 |
| 20HH | FRH | 23 | 7 | 47 | 22 | 14 | 7 | 0 | 10 |
| 20HH | FCL | 0 | 21 | 53 | 13 | 25 | 20 | 14 | 17 |
| 20HH | FCH | 20 | 36 | 40 | 0 | 0 | 6 | 20 | 9 |
| 20HH | FLL | 37 | 8 | 15 | 42 | 42 | 46 | 12 | 26 |
| 20HH | FLH | 26 | 0 | 10 | 34 | 0 | 1 | 11 | 0 |

## DEVIATION SCORES--RADIAL ERROR (CONT'D)

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 21HH | SRL | 27 | 39 | 66 | 59 | 9 | 0 | 27 | 0 |
| 21HH | SRH | 40 | 50 | 76 | 3 | 34 | 38 | 12 | 50 |
| 21HH | SCL | 16 | 29 | 26 | 25 | 0 | 0 | 20 | 0 |
| 21HH | SCH | 62 | 45 | 41 | 14 | 1 | 23 | 1 | 0 |
| 21HH | SLL | 52 | 25 | 34 | 34 | 20 | 10 | 2 | 14 |
| 21HH | SLH | 73 | 40 | 106 | 73 | 0 | 3 | 25 | 0 |
| 21HH | FRL | 9 | 29 | 29 | 19 | 69 | 77 | 8 | 0 |
| 21HH | FRH | 133 | 52 | 42 | 2 | 0 | 17 | 45 | 40 |
| 21HH | FCL | 12 | 0 | 36 | 12 | 0 | 17 | 22 | 9 |
| 21HH | FCH | 92 | 66 | 82 | 30 | 31 | 82 | 65 | 79 |
| 21HH | FLL | 14 | 23 | 33 | 41 | 40 | 23 | 11 | 12 |
| 21HH | FLH | 32 | 21 | 27 | 60 | 51 | 7 | 64 | 0 |
| 22HH | SRL | 13 | 26 | 24 | 2 | 9 | 0 | 7 | 0 |
| 22HH | SRH | 23 | 30 | 35 | 50 | 131 | 44 | 69 | 25 |
| 22HH | SCL | 39 | 17 | 0 | 66 | 11 | 0 | 0 | 3 |
| 22HH | SCH | 9 | 13 | 22 | 18 | 16 | 54 | 15 | 20 |
| 22HH | SLL | 17 | 15 | 24 | 23 | 13 | 20 | 0 | 11 |
| 22HH | SLH | 17 | 48 | 40 | 38 | 81 | 28 | 42 | 21 |
| 22HH | FRL | 10 | 80 | 19 | 14 | 9 | 1 | 29 | 0 |
| 22HH | FRH | 27 | 24 | 52 | 31 | 39 | 35 | 33 | 23 |
| 22HH | FCL | 14 | 46 | 30 | 5 | 20 | 10 | 5 | 9 |
| 22HH | FCH | 70 | 69 | 45 | 0 | 19 | 52 | 36 | 11 |
| 22HH | FLL | 32 | 27 | 25 | 15 | 9 | 0 | 7 | 3 |
| 22HH | FLH | 30 | 31 | 34 | 48 | 33 | 44 | 18 | 23 |
| 23HH | SRL | 31 | 3 | 14 | 8 | 9 | 32 | 0 | 19 |
| 23HH | SRH | 25 | 31 | 22 | 15 | 13 | 33 | 16 | 25 |
| 23HH | SCL | 4 | 1 | 8 | 0 | 9 | 31 | 15 | 0 |
| 23HH | SCH | 6 | 4 | 13 | 30 | 5 | 9 | 10 | 23 |
| 23HH | SLL | 15 | 26 | 13 | 4 | 0 | 9 | 14 | 29 |
| 23HH | SLH | 10 | 20 | 30 | 23 | 25 | 80 | 21 | 56 |
| 23HH | FRL | 38 | 27 | 43 | 45 | 32 | 22 | 40 | 18 |
| 23HH | FRH | 62 | 68 | 30 | 42 | 32 | 0 | 13 | 8 |
| 23HH | FCL | 45 | 0 | 25 | 23 | 31 | 25 | 18 | 33 |
| 23HH | FCH | 49 | 38 | 26 | 27 | 5 | 43 | 18 | 18 |
| 23HH | FLL | 0 | 20 | 45 | 2 | 24 | 21 | 26 | 49 |
| 23HH | FLH | 6 | 0 | 20 | 53 | 9 | 50 | 18 | 26 |
| 24HH | SRL | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 8 |
| 24HH | SRH | 16 | 16 | 31 | 25 | 46 | 0 | 0 | 2 |
| 24HH | SCL | 41 | 12 | 0 | 40 | 0 | 6 | 8 | 0 |
| 24HH | SCH | 30 | 13 | 29 | 0 | 36 | 0 | 9 | 0 |
| 24HH | SLL | 35 | 10 | 0 | 21 | 36 | 0 | 23 | 0 |
| 24HH | SLH | 23 | 0 | 0 | 0 | 0 | 0 | 6 | 30 |
| 24HH | FRL | 19 | 54 | 15 | 38 | 95 | 47 | 88 | 100 |
| 24HH | FRH | 14 | 18 | 20 | 0 | 26 | 33 | 34 | 8 |
| 24HH | FCL | 6 | 27 | 27 | 53 | 26 | 37 | 36 | 29 |
| 24HH | FCH | 51 | 8 | 0 | 8 | 30 | 8 | 0 | 12 |
| 24HH | FLL | 34 | 40 | 55 | 59 | 42 | 28 | 45 | 41 |
| 24HH | FLH | 30 | 20 | 47 | 34 | 48 | 10 | 1 | 3 |

## DEVIATION SCORES--RADIAL ERROR (CONT'D)

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 25HH | SRL | 0 | 0 | 26 | 23 | 9 | 0 | 1 | 8 |
| 25HH | SRH | 14 | 11 | 6 | 14 | 6 | 19 | 16 | 9 |
| 25HH | SCL | 7 | 21 | 15 | 14 | 8 | 5 | 13 | 31 |
| 25HH | SCH | 18 | 14 | 57 | 21 | 0 | 0 | 10 | 14 |
| 25HH | SLL | 0 | 21 | 32 | 22 | 0 | 0 | 4 | 0 |
| 25HH | SLH | 0 | 0 | 0 | 17 | 14 | 0 | 4 | 0 |
| 25HH | FRL | 109 | 0 | 75 | 55 | 119 | 42 | 134 | 68 |
| 25HH | FRH | 22 | 129 | 30 | 0 | 8 | 5 | 14 | 49 |
| 25HH | FCL | 40 | 77 | 46 | 70 | 0 | 28 | 1 | 35 |
| 25HH | FCH | 91 | 18 | 0 | 4 | 11 | 0 | 25 | 0 |
| 25HH | FLL | 77 | 50 | 79 | 8 | 78 | 36 | 48 | 24 |
| 25HH | FLH | 2 | 74 | 6 | 0 | 23 | 14 | 0 | 1 |
| 26HH | SRL | 34 | 6 | 12 | 4 | 1 | 2 | 0 | 8 |
| 26HH | SRH | 0 | 26 | 41 | 26 | 20 | 37 | 38 | 23 |
| 26HH | SCL | 22 | 15 | 4 | 43 | 2 | 2 | 0 | 9 |
| 26HH | SCH | 37 | 60 | 69 | 11 | 39 | 41 | 28 | 27 |
| 26HH | SLL | 25 | 33 | 21 | 14 | 62 | 36 | 8 | 22 |
| 26HH | SLH | 24 | 26 | 5 | 21 | 28 | 35 | 21 | 23 |
| 26HH | FRL | 29 | 30 | 17 | 6 | 92 | 43 | 8 | 25 |
| 26HH | FRH | 54 | 46 | 46 | 29 | 23 | 32 | 40 | 33 |
| 26HH | FCL | 17 | 4 | 39 | 0 | 1 | 8 | 24 | 5 |
| 26HH | FCH | 100 | 32 | 63 | 6 | 0 | 21 | 71 | 14 |
| 26HH | FLL | 67 | 40 | 19 | 13 | 7 | 5 | 26 | 14 |
| 26HH | FLH | 7 | 86 | 15 | 0 | 23 | 30 | 0 | 19 |
| 27HH | SRL | 34 | 24 | 0 | 0 | 4 | 11 | 1 | 7 |
| 27HH | SRH | 23 | 80 | 16 | 48 | 0 | 0 | 0 | 20 |
| 27HH | SCL | 63 | 16 | 20 | 37 | 0 | 0 | 0 | 0 |
| 27HH | SCH | 59 | 54 | 39 | 51 | 40 | 28 | 25 | 22 |
| 27HH | SLL | 82 | 63 | 0 | 3 | 0 | 22 | 0 | 6 |
| 27HH | SLH | 117 | 117 | 51 | 53 | 40 | 24 | 68 | 66 |
| 27HH | FRL | 12 | 23 | 52 | 53 | 37 | 32 | 65 | 49 |
| 27HH | FRH | 11 | 15 | 16 | 43 | 17 | 43 | 51 | 31 |
| 27HH | FCL | 30 | 17 | 1 | 2 | 9 | 92 | 0 | 8 |
| 27HH | FCH | 41 | 57 | 50 | 17 | 25 | 33 | 56 | 40 |
| 27HH | FLL | 0 | 0 | 0 | 4 | 0 | 2 | 15 | 2 |
| 27HH | FLH | 48 | 69 | 21 | 39 | 35 | 40 | 18 | 35 |
| 28HL | SRL | 89 | 92 | 114 | 0 | 60 | 72 | 59 | 13 |
| 28HL | SRH | 88 | 97 | 166 | 129 | 112 | 65 | 68 | 56 |
| 28HL | SCL | 58 | 69 | 82 | 62 | 76 | 32 | 74 | 43 |
| 28HL | SCH | 82 | 126 | 124 | 153 | 116 | 140 | 104 | 146 |
| 28HL | SLL | 94 | 71 | 73 | 110 | 96 | 52 | 64 | 26 |
| 28HL | SLH | 101 | 123 | 127 | 155 | 131 | 112 | 129 | 110 |
| 28HL | FRL | 62 | 102 | 15 | 68 | 80 | 63 | 78 | 75 |
| 28HL | FRH | 36 | 34 | 37 | 38 | 33 | 34 | 42 | 32 |
| 28HL | FCL | 85 | 7 | 39 | 4 | 45 | 63 | 38 | 41 |
| 28HL | FCH | 0 | 79 | 4 | 29 | 0 | 14 | 114 | 0 |
| 28HL | FLL | 79 | 15 | 22 | 53 | 50 | 26 | 45 | 41 |
| 28HL | FLH | 6 | 0 | 15 | 88 | 11 | 0 | 2 | 22 |

## DEVIATION SCORES--RADIAL ERROR (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 29HL | SRL | 5 | 23 | 29 | 26 | 42 | 34 | 30 | 29 |
| 29HL | SRH | 63 | 50 | 42 | 28 | 60 | 29 | 38 | 30 |
| 29HL | SCL | 2 | 36 | 16 | 25 | 14 | 9 | 12 | 17 |
| 29HL | SCH | 15 | 33 | 56 | 45 | 31 | 24 | 38 | 35 |
| 29HL | SLL | 26 | 41 | 48 | 55 | 39 | 36 | 39 | 29 |
| 29HL | SLH | 39 | 65 | 48 | 74 | 57 | 66 | 52 | 59 |
| 29HL | FRL | 92 | 115 | 124 | 112 | 129 | 126 | 117 | 108 |
| 29HL | FRH | 64 | 65 | 61 | 42 | 87 | 71 | 81 | 74 |
| 29HL | FCL | 128 | 124 | 59 | 101 | 119 | 130 | 77 | 74 |
| 29HL | FCH | 90 | 83 | 30 | 65 | 52 | 108 | 55 | 34 |
| 29HL | FLL | 108 | 92 | 102 | 99 | 105 | 108 | 114 | 92 |
| 29HL | FLH | 81 | 64 | 54 | 70 | 74 | 67 | 65 | 58 |
| 30HL | SRL | 47 | 74 | 51 | 115 | 76 | 93 | 97 | 60 |
| 30HL | SRH | 120 | 71 | 130 | 206 | 126 | 140 | 67 | 107 |
| 30HL | SCL | 66 | 5 | 122 | 31 | 100 | 64 | 98 | 53 |
| 30HL | SCH | 182 | 162 | 164 | 162 | 48 | 122 | 115 | 136 |
| 30HL | SLL | 113 | 113 | 120 | 134 | 139 | 131 | 97 | 121 |
| 30HL | SLH | 130 | 167 | 30 | 128 | 201 | 107 | 100 | 185 |
| 30HL | FRL | 6 | 23 | 8 | 94 | 18 | 7 | 13 | 0 |
| 30HL | FRH | 35 | 22 | 19 | 21 | 32 | 8 | 25 | 9 |
| 30HL | FCL | 28 | 9 | 38 | 22 | 0 | 4 | 13 | 6 |
| 30HL | FCH | 20 | 65 | 30 | 45 | 33 | 33 | 19 | 23 |
| 30HL | FLL | 20 | 0 | 16 | 0 | 26 | 49 | 6 | 74 |
| 30HL | FLH | 47 | 21 | 25 | 78 | 12 | 9 | 0 | 5 |
| 31HL | SRL | 93 | 102 | 44 | 50 | 2 | 44 | 60 | 0 |
| 31HL | SRH | 84 | 172 | 127 | 125 | 72 | 44 | 60 | 41 |
| 31HL | SCL | 20 | 17 | 39 | 28 | 10 | 57 | 0 | 0 |
| 31HL | SCH | 137 | 105 | 182 | 96 | 116 | 59 | 35 | 10 |
| 31HL | SLL | 36 | 45 | 20 | 87 | 0 | 0 | 0 | 26 |
| 31HL | SLH | 195 | 116 | 82 | 45 | 94 | 30 | 27 | 27 |
| 31HL | FRL | 18 | 1 | 33 | 12 | 40 | 39 | 12 | 9 |
| 31HL | FRH | 37 | 57 | 29 | 2 | 20 | 28 | 27 | 51 |
| 31HL | FCL | 12 | 28 | 20 | 5 | 60 | 42 | 11 | 6 |
| 31HL | FCH | 56 | 39 | 18 | 0 | 0 | 33 | 24 | 10 |
| 31HL | FLL | 11 | 16 | 0 | 14 | 29 | 18 | 32 | 23 |
| 31HL | FLH | 65 | 54 | 59 | 0 | 29 | 26 | 0 | 0 |
| 32HL | SRL | 71 | 44 | 0 | 3 | 26 | 23 | 24 | 29 |
| 32HL | SRH | 138 | 89 | 30 | 17 | 60 | 41 | 5 | 96 |
| 32HL | SCL | 20 | 28 | 8 | 9 | 0 | 0 | 6 | 0 |
| 32HL | SCH | 56 | 24 | 31 | 12 | 33 | 37 | 43 | 20 |
| 32HL | SLL | 22 | 18 | 25 | 23 | 10 | 21 | 19 | 25 |
| 32HL | SLH | 125 | 53 | 106 | 27 | 66 | 20 | 32 | 14 |
| 32HL | FRL | 123 | 101 | 83 | 107 | 121 | 122 | 115 | 94 |
| 32HL | FRH | 73 | 70 | 42 | 68 | 95 | 68 | 66 | 87 |
| 32HL | FCL | 91 | 74 | 50 | 171 | 89 | 67 | 110 | 79 |
| 32HL | FCH | 47 | 51 | 51 | 50 | 37 | 52 | 21 | 14 |
| 32HL | FLL | 22 | 83 | 77 | 66 | 91 | 107 | 88 | 81 |
| 32HL | FLH | 42 | 61 | 60 | 65 | 50 | 121 | 51 | 25 |

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 33HL | SRL | 146 | 128 | 138 | 144 | 164 | 139 | 137 | 158 |
| 33HL | SRH | 148 | 198 | 208 | 187 | 185 | 188 | 188 | 185 |
| 33HL | SCL | 136 | 63 | 139 | 113 | 109 | 114 | 115 | 116 |
| 33HL | SCH | 78 | 203 | 178 | 184 | 240 | 167 | 220 | 203 |
| 33HL | SLL | 49 | 137 | 155 | 111 | 108 | 89 | 124 | 118 |
| 33HL | SLH | 184 | 187 | 238 | 166 | 141 | 169 | 182 | 173 |
| 33HL | FRL | 19 | 26 | 17 | 10 | 3 | 34 | 11 | 4 |
| 33HL | FRH | 25 | 30 | 42 | 12 | 0 | 13 | 2 | 6 |
| 33HL | FCL | 26 | 0 | 0 | 12 | 50 | 0 | 21 | 20 |
| 33HL | FCH | 20 | 23 | 52 | 23 | 15 | 7 | 3 | 33 |
| 33HL | FLL | 47 | 69 | 8 | 37 | 26 | 48 | 43 | 25 |
| 33HL | FLH | 8 | 60 | 0 | 12 | 31 | 0 | 0 | 30 |
| 34HL | SRL | 60 | 7 | 11 | 0 | 0 | 0 | 0 | 11 |
| 34HL | SRH | 73 | 29 | 0 | 11 | 49 | 24 | 20 | 22 |
| 34HL | SCL | 12 | 0 | 0 | 12 | 0 | 0 | 0 | 21 |
| 34HL | SCH | 35 | 47 | 16 | 14 | 23 | 23 | 5 | 12 |
| 34HL | SLL | 74 | 3 | 24 | 33 | 19 | 26 | 0 | 1 |
| 34HL | SLH | 75 | 36 | 39 | 44 | 18 | 62 | 27 | 199 |
| 34HL | FRL | 113 | 117 | 145 | 152 | 212 | 175 | 155 | 174 |
| 34HL | FRH | 92 | 125 | 117 | 129 | 124 | 148 | 107 | 160 |
| 34HL | FCL | 133 | 177 | 184 | 171 | 177 | 176 | 153 | 157 |
| 34HL | FCH | 137 | 121 | 149 | 161 | 122 | 161 | 158 | 152 |
| 34HL | FLL | 122 | 143 | 161 | 135 | 149 | 150 | 142 | 161 |
| 34HL | FLH | 78 | 102 | 120 | 126 | 117 | 124 | 126 | 161 |
| 35HL | SRL | 63 | 4 | 27 | 30 | 45 | 20 | 0 | 28 |
| 35HL | SRH | 83 | 163 | 96 | 17 | 89 | 41 | 115 | 65 |
| 35HL | SCL | 65 | 37 | 36 | 36 | 26 | 17 | 0 | 0 |
| 35HL | SCH | 86 | 172 | 26 | 125 | 128 | 74 | 54 | 31 |
| 35HL | SLL | 87 | 32 | 40 | 77 | 60 | 72 | 5 | 0 |
| 35HL | SLH | 136 | 30 | 47 | 84 | 125 | 88 | 90 | 74 |
| 35HL | FRL | 70 | 53 | 25 | 41 | 161 | 91 | 68 | 72 |
| 35HL | FRH | 75 | 56 | 24 | 36 | 51 | 40 | 6 | 19 |
| 35HL | FCL | 26 | 0 | 17 | 17 | 33 | 12 | 31 | 20 |
| 35HL | FCH | 2 | 0 | 0 | 18 | 9 | 0 | 0 | 0 |
| 35HL | FLL | 0 | 41 | 18 | 62 | 83 | 106 | 91 | 94 |
| 35HL | FLH | 38 | 33 | 23 | 3 | 60 | 67 | 0 | 29 |
| 36HL | SRL | 108 | 66 | 16 | 2 | 7 | 18 | 31 | 1 |
| 36HL | SRH | 27 | 33 | 28 | 28 | 24 | 36 | 41 | 42 |
| 36HL | SCL | 93 | 7 | 13 | 5 | 0 | 0 | 0 | 2 |
| 36HL | SCH | 67 | 174 | 67 | 42 | 107 | 20 | 94 | 10 |
| 36HL | SLL | 18 | 17 | 9 | 25 | 0 | 7 | 0 | 0 |
| 36HL | SLH | 76 | 133 | 54 | 142 | 41 | 63 | 58 | 43 |
| 36HL | FRL | 64 | 78 | 77 | 67 | 94 | 58 | 98 | 79 |
| 36HL | FRH | 65 | 44 | 37 | 32 | 46 | 69 | 61 | 36 |
| 36HL | FCL | 24 | 68 | 44 | 137 | 74 | 116 | 80 | 28 |
| 36HL | FCH | 34 | 47 | 0 | 4 | 25 | 12 | 159 | 9 |
| 36HL | FLL | 73 | 52 | 46 | 131 | 79 | 121 | 65 | 68 |
| 36HL | FLH | 29 | 0 | 29 | 56 | 26 | 38 | 29 | 0 |

## DEVIATION SCORES--RADIAL ERROR (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 37CH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 37CH | SRH | 10 | 13 | 27 | 23 | 10 | 10 | 9 | 62 |
| 37CH | SCL | 3 | 7 | 10 | 6 | 14 | 7 | 8 | 20 |
| 37CH | SCH | 28 | 25 | 27 | 44 | 85 | 46 | 25 | 78 |
| 37CH | SLL | 10 | 14 | 16 | 9 | 21 | 13 | 21 | 8 |
| 37CH | SLH | 34 | 15 | 37 | 35 | 65 | 41 | 45 | 31 |
| 37CH | FRL | 85 | 0 | 2 | 41 | 32 | 39 | 97 | 24 |
| 37CH | FRH | 23 | 25 | 49 | 34 | 54 | 36 | 38 | 30 |
| 37CH | FCL | 13 | 7 | 21 | 10 | 25 | 16 | 0 | 41 |
| 37CH | FCH | 40 | 68 | 64 | 66 | 54 | 75 | 63 | 73 |
| 37CH | FLL | 37 | 50 | 32 | 29 | 5 | 25 | 46 | 7 |
| 37CH | FLH | 0 | 1 | 6 | 34 | 42 | 29 | 51 | 63 |
| 38CH | SRL | 29 | 15 | 17 | 18 | 20 | 28 | 26 | 20 |
| 38CH | SRH | 31 | 50 | 50 | 80 | 95 | 57 | 95 | 71 |
| 38CH | SCL | 34 | 55 | 19 | 25 | 23 | 40 | 17 | 45 |
| 38CH | SCH | 40 | 43 | 12 | 52 | 58 | 40 | 75 | 41 |
| 38CH | SLL | 55 | 70 | 50 | 52 | 31 | 46 | 55 | 29 |
| 38CH | SLH | 40 | 67 | 64 | 68 | 74 | 58 | 62 | 65 |
| 38CH | FRL | 23 | 16 | 2 | 0 | 19 | 20 | 39 | 38 |
| 38CH | FRH | 8 | 24 | 24 | 19 | 30 | 13 | 5 | 34 |
| 38CH | FCL | 35 | 20 | 2 | 12 | 9 | 16 | 6 | 12 |
| 38CH | FCH | 27 | 26 | 40 | 38 | 44 | 36 | 31 | 48 |
| 38CH | FLL | 12 | 17 | 36 | 12 | 0 | 12 | 13 | 14 |
| 38CH | FLH | 35 | 26 | 30 | 26 | 19 | 39 | 48 | 48 |
| 39CH | SRL | 0 | 0 | 4 | 28 | 5 | 0 | 0 | 0 |
| 39CH | SRH | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 39CH | SCL | 0 | 0 | 0 | 0 | 4 | 13 | 0 | 0 |
| 39CH | SCH | 25 | 18 | 18 | 0 | 23 | 31 | 15 | 0 |
| 39CH | SLL | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 39CH | SLH | 14 | 0 | 16 | 6 | 13 | 16 | 15 | 0 |
| 39CH | FRL | 6 | 17 | 0 | 0 | 0 | 3 | 1 | 4 |
| 39CH | FRH | 27 | 31 | 26 | 5 | 23 | 27 | 18 | 7 |
| 39CH | FCL | 6 | 0 | 0 | 9 | 5 | 4 | 0 | 4 |
| 39CH | FCH | 4 | 3 | 4 | 3 | 3 | 3 | 3 | 3 |
| 39CH | FLL | 16 | 11 | 25 | 21 | 24 | 14 | 23 | 26 |
| 39CH | FLH | 0 | 29 | 22 | 20 | 20 | 11 | 15 | 19 |
| 40CH | SRL | 41 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 40CH | SRH | 11 | 51 | 35 | 23 | 32 | 31 | 12 | 0 |
| 40CH | SCL | 10 | 12 | 15 | 14 | 15 | 16 | 12 | 0 |
| 40CH | SCH | 11 | 68 | 41 | 39 | 41 | 27 | 52 | 69 |
| 40CH | SLL | 23 | 30 | 23 | 5 | 16 | 17 | 12 | 8 |
| 40CH | SLH | 11 | 17 | 30 | 57 | 37 | 61 | 35 | 0 |
| 40CH | FRL | 20 | 10 | 0 | 0 | 0 | 23 | 11 | 7 |
| 40CH | FRH | 21 | 51 | 18 | 60 | 44 | 5 | 2 | 58 |
| 40CH | FCL | 15 | 27 | 15 | 47 | 21 | 5 | 8 | 13 |
| 40CH | FCH | 30 | 36 | 75 | 32 | 52 | 45 | 57 | 65 |
| 40CH | FLL | 19 | 27 | 11 | 28 | 24 | 35 | 26 | 38 |
| 40CH | FLH | 27 | 10 | 27 | 7 | 11 | 6 | 9 | 16 |

## DEVIATION SCORES--RADIAL ERROR (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 41CH | SRL | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 |
| 41CH | SRH | 11 | 0 | 0 | 0 | 6 | 0 | 8 | 2 |
| 41CH | SCL | 6 | 0 | 5 | 1 | 10 | 3 | 16 | 10 |
| 41CH | SCH | 8 | 6 | 0 | 10 | 16 | 3 | 10 | 4 |
| 41CH | SLL | 4 | 11 | 0 | 8 | 10 | 15 | 24 | 19 |
| 41CH | SLH | 16 | 4 | 4 | 5 | 7 | 2 | 23 | 8 |
| 41CH | FRL | 35 | 14 | 12 | 11 | 5 | 5 | 0 | 0 |
| 41CH | FRH | 4 | 21 | 8 | 10 | 3 | 2 | 3 | 10 |
| 41CH | FCL | 16 | 1 | 8 | 3 | 2 | 5 | 18 | 1 |
| 41CH | FCH | 70 | 72 | 0 | 51 | 38 | 19 | 39 | 10 |
| 41CH | FLL | 11 | 22 | 4 | 12 | 6 | 8 | 8 | 14 |
| 41CH | FLH | 17 | 1 | 5 | 2 | 3 | 3 | 6 | 0 |
| 42CH | SRL | 17 | 20 | 12 | 15 | 19 | 8 | 6 | 13 |
| 42CH | SRH | 20 | 6 | 6 | 10 | 16 | 10 | 8 | 15 |
| 42CH | SCL | 21 | 0 | 16 | 8 | 2 | 4 | 6 | 0 |
| 42CH | SCH | 3 | 15 | 7 | 9 | 6 | 2 | 3 | 0 |
| 42CH | SLL | 24 | 10 | 22 | 10 | 13 | 12 | 8 | 17 |
| 42CH | SLH | 25 | 35 | 45 | 21 | 13 | 29 | 36 | 34 |
| 42CH | FRL | 8 | 11 | 22 | 12 | 17 | 9 | 7 | 11 |
| 42CH | FRH | 7 | 6 | 11 | 6 | 8 | 13 | 21 | 31 |
| 42CH | FCL | 23 | 25 | 1 | 11 | 10 | 11 | 0 | 15 |
| 42CH | FCH | 1 | 0 | 0 | 4 | 20 | 0 | 13 | 5 |
| 42CH | FLL | 24 | 5 | 4 | 0 | 10 | 9 | 0 | 7 |
| 42CH | FLH | 6 | 0 | 0 | 5 | 7 | 0 | 22 | 0 |
| 43CH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| 43CH | SRH | 0 | 7 | 15 | 7 | 1 | 36 | 15 | 17 |
| 43CH | SCL | 2 | 4 | 7 | 7 | 11 | 0 | 0 | 0 |
| 43CH | SCH | 0 | 14 | 29 | 16 | 13 | 2 | 20 | 20 |
| 43CH | SLL | 0 | 2 | 7 | 9 | 1 | 16 | 6 | 15 |
| 43CH | SLH | 13 | 21 | 30 | 15 | 0 | 0 | 12 | 14 |
| 43CH | FRL | 3 | 27 | 57 | 29 | 55 | 58 | 31 | 55 |
| 43CH | FRH | 51 | 19 | 22 | 29 | 28 | 41 | 24 | 21 |
| 43CH | FCL | 33 | 22 | 26 | 9 | 11 | 19 | 28 | 18 |
| 43CH | FCH | 63 | 43 | 63 | 29 | 43 | 38 | 50 | 57 |
| 43CH | FLL | 21 | 24 | 51 | 24 | 21 | 37 | 29 | 30 |
| 43CH | FLH | 6 | 7 | 11 | 12 | 15 | 35 | 10 | 32 |
| 44CH | SRL | 15 | 24 | 2 | 0 | 0 | 19 | 9 | 9 |
| 44CH | SRH | 3 | 2 | 1 | 1 | 2 | 0 | 0 | 0 |
| 44CH | SCL | 18 | 15 | 2 | 0 | 7 | 5 | 6 | 15 |
| 44CH | SCH | 0 | 1 | 10 | 5 | 9 | 24 | 7 | 4 |
| 44CH | SLL | 7 | 0 | 22 | 9 | 16 | 14 | 33 | 0 |
| 44CH | SLH | 15 | 7 | 12 | 6 | 11 | 0 | 11 | 29 |
| 44CH | FRL | 10 | 19 | 50 | 31 | 40 | 81 | 86 | 46 |
| 44CH | FRH | 38 | 53 | 71 | 21 | 30 | 72 | 30 | 64 |
| 44CH | FCL | 6 | 4 | 2 | 4 | 10 | 0 | 5 | 0 |
| 44CH | FCH | 62 | 67 | 22 | 38 | 54 | 20 | 0 | 58 |
| 44CH | FLL | 23 | 12 | 38 | 86 | 37 | 18 | 17 | 49 |
| 44CH | FLH | 32 | 84 | 9 | 22 | 29 | 16 | 72 | 15 |

## DEVIATION SCORES--RADIAL ERROR (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 45CH | SRL | 15 | 9 | 3 | 7 | 0 | 13 | 0 | 0 |
| 45CH | SRH | 0 | 0 | 15 | 4 | 2 | 6 | 6 | 0 |
| 45CH | SCL | 10 | 0 | 0 | 6 | 0 | 0 | 0 | 0 |
| 45CH | SCH | 10 | 5 | 0 | 1 | 0 | 0 | 8 | 0 |
| 45CH | SLL | 4 | 0 | 3 | 7 | 7 | 12 | 9 | 22 |
| 45CH | SLH | 0 | 13 | 8 | 0 | 1 | 0 | 0 | 4 |
| 45CH | FRL | 32 | 21 | 37 | 21 | 16 | 56 | 39 | 4 |
| 45CH | FRH | 97 | 137 | 86 | 43 | 38 | 93 | 40 | 20 |
| 45CH | FCL | 20 | 23 | 6 | 14 | 11 | 15 | 4 | 16 |
| 45CH | FCH | 5 | 25 | 19 | 13 | 14 | 18 | 8 | 13 |
| 45CH | FLL | 3 | 15 | 23 | 8 | 18 | 25 | 10 | 43 |
| 45CH | FLH | 30 | 35 | 10 | 16 | 15 | 30 | 12 | 34 |
| 46CL | SRL | 6 | 15 | 23 | 20 | 30 | 21 | 19 | 31 |
| 46CL | SRH | 80 | 23 | 52 | 43 | 17 | 60 | 27 | 57 |
| 46CL | SCL | 4 | 0 | 7 | 13 | 0 | 1 | 18 | 8 |
| 46CL | SCH | 24 | 20 | 36 | 37 | 33 | 35 | 39 | 35 |
| 46CL | SLL | 28 | 34 | 13 | 16 | 25 | 30 | 9 | 17 |
| 46CL | SLH | 98 | 74 | 34 | 36 | 35 | 32 | 38 | 62 |
| 46CL | FRL | 44 | 111 | 35 | 40 | 40 | 45 | 11 | 39 |
| 46CL | FRH | 24 | 25 | 12 | 0 | 10 | 0 | 0 | 0 |
| 46CL | FCL | 99 | 60 | 42 | 11 | 22 | 0 | 6 | 19 |
| 46CL | FCH | 55 | 54 | 34 | 26 | 22 | 22 | 22 | 49 |
| 46CL | FLL | 34 | 53 | 28 | 29 | 23 | 27 | 31 | 22 |
| 46CL | FLH | 14 | 6 | 21 | 15 | 16 | 20 | 13 | 19 |
| 47CL | SRL | 74 | 50 | 40 | 66 | 95 | 68 | 60 | 67 |
| 47CL | SRH | 64 | 1 | 65 | 70 | 71 | 109 | 9 | 71 |
| 47CL | SCL | 25 | 20 | 19 | 30 | 34 | 24 | 30 | 35 |
| 47CL | SCH | 86 | 98 | 58 | 60 | 56 | 67 | 65 | 65 |
| 47CL | SLL | 104 | 47 | 36 | 50 | 50 | 73 | 41 | 36 |
| 47CL | SLH | 88 | 81 | 49 | 74 | 82 | 112 | 20 | 100 |
| 47CL | FRL | 95 | 48 | 4 | 18 | 27 | 14 | 10 | 12 |
| 47CL | FRH | 33 | 57 | 22 | 16 | 0 | 38 | 0 | 105 |
| 47CL | FCL | 3 | 0 | 33 | 18 | 25 | 27 | 20 | 16 |
| 47CL | FCH | 1 | 58 | 81 | 51 | 47 | 87 | 52 | 40 |
| 47CL | FLL | 12 | 2 | 9 | 6 | 3 | 12 | 5 | 27 |
| 47CL | FLH | 0 | 21 | 0 | 40 | 28 | 55 | 17 | 38 |
| 48CL | SRL | 43 | 38 | 36 | 17 | 38 | 27 | 25 | 40 |
| 48CL | SRH | 42 | 79 | 86 | 91 | 49 | 52 | 112 | 85 |
| 48CL | SCL | 10 | 76 | 43 | 38 | 4 | 0 | 29 | 16 |
| 48CL | SCH | 69 | 59 | 71 | 88 | 98 | 76 | 85 | 61 |
| 48CL | SLL | 20 | 36 | 19 | 28 | 18 | 15 | 13 | 29 |
| 48CL | SLH | 61 | 87 | 0 | 112 | 62 | 42 | 39 | 104 |
| 48CL | FRL | 93 | 82 | 70 | 34 | 60 | 53 | 47 | 12 |
| 48CL | FRH | 51 | 32 | 28 | 12 | 10 | 0 | 16 | 29 |
| 48CL | FCL | 20 | 54 | 26 | 8 | 4 | 13 | 24 | 9 |
| 48CL | FCH | 0 | 36 | 20 | 18 | 21 | 30 | 25 | 14 |
| 48CL | FLL | 39 | 76 | 52 | 51 | 43 | 26 | 55 | 3 |
| 48CL | FLH | 0 | 32 | 27 | 0 | 13 | 10 | 7 | 33 |

DEVIATION SCORES--RADIAL ERROR (CONT'D)

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 49CL | SRL | 48 | 81 | 78 | 69 | 72 | 78 | 60 | 71 |
| 49CL | SRH | 0 | 33 | 66 | 48 | 0 | 40 | 54 | 61 |
| 49CL | SCL | 80 | 107 | 76 | 84 | 97 | 71 | 82 | 87 |
| 49CL | SCH | 5 | 13 | 19 | 46 | 0 | 13 | 18 | 0 |
| 49CL | SLL | 78 | 86 | 82 | 71 | 42 | 76 | 72 | 67 |
| 49CL | SLH | 41 | 0 | 11 | 10 | 13 | 53 | 41 | 26 |
| 49CL | FRL | 158 | 219 | 161 | 251 | 136 | 190 | 177 | 127 |
| 49CL | FRH | 63 | 137 | 136 | 111 | 80 | 127 | 183 | 146 |
| 49CL | FCL | 176 | 150 | 114 | 22 | 160 | 109 | 93 | 86 |
| 49CL | FCH | 43 | 129 | 104 | 135 | 36 | 30 | 120 | 100 |
| 49CL | FLL | 75 | 136 | 163 | 210 | 165 | 161 | 147 | 134 |
| 49CL | FLH | 54 | 122 | 130 | 178 | 93 | 129 | 102 | 93 |
| 50CL | SRL | 32 | 1 | 9 | 32 | 0 | 12 | 6 | 0 |
| 50CL | SRH | 11 | 36 | 7 | 25 | 12 | 0 | 15 | 22 |
| 50CL | SCL | 5 | 4 | 2 | 0 | 14 | 0 | 10 | 5 |
| 50CL | SCH | 79 | 56 | 29 | 0 | 34 | 30 | 27 | 42 |
| 50CL | SLL | 68 | 0 | 2 | 0 | 0 | 0 | 10 | 11 |
| 50CL | SLH | 59 | 184 | 24 | 0 | 23 | 8 | 18 | 22 |
| 50CL | FRL | 47 | 44 | 18 | 28 | 50 | 33 | 53 | 47 |
| 50CL | FRH | 55 | 32 | 32 | 28 | 57 | 51 | 46 | 26 |
| 50CL | FCL | 34 | 15 | 0 | 26 | 46 | 23 | 0 | 30 |
| 50CL | FCH | 29 | 42 | 0 | 12 | 25 | 29 | 35 | 34 |
| 50CL | FLL | 45 | 44 | 40 | 100 | 38 | 16 | 24 | 35 |
| 50CL | FLH | 75 | 29 | 23 | 25 | 33 | 23 | 26 | 36 |
| 51CL | SRL | 50 | 53 | 42 | 36 | 45 | 62 | 51 | 39 |
| 51CL | SRH | 64 | 97 | 85 | 34 | 112 | 41 | 66 | 56 |
| 51CL | SCL | 0 | 11 | 59 | 76 | 62 | 139 | 22 | 31 |
| 51CL | SCH | 10 | 60 | 137 | 121 | 114 | 179 | 108 | 100 |
| 51CL | SLL | 58 | 93 | 107 | 109 | 121 | 171 | 133 | 157 |
| 51CL | SLH | 113 | 35 | 117 | 189 | 158 | 89 | 104 | 137 |
| 51CL | FRL | 149 | 104 | 0 | 50 | 114 | 102 | 99 | 86 |
| 51CL | FRH | 106 | 20 | 54 | 33 | 30 | 37 | 48 | 48 |
| 51CL | FCL | 129 | 99 | 17 | 149 | 162 | 85 | 79 | 101 |
| 51CL | FCH | 29 | 0 | 0 | 68 | 127 | 4 | 20 | 11 |
| 51CL | FLL | 67 | 91 | 28 | 27 | 132 | 156 | 104 | 116 |
| 51CL | FLH | 88 | 31 | 24 | 103 | 117 | 101 | 108 | 117 |
| 52CL | SRL | 5 | 2 | 11 | 47 | 25 | 42 | 26 | 32 |
| 52CL | SRH | 43 | 78 | 30 | 55 | 91 | 52 | 43 | 41 |
| 52CL | SCL | 17 | 18 | 15 | 3 | 0 | 0 | 0 | 0 |
| 52CL | SCH | 35 | 120 | 49 | 23 | 52 | 19 | 36 | 45 |
| 52CL | SLL | 50 | 45 | 47 | 50 | 51 | 38 | 43 | 43 |
| 52CL | SLH | 66 | 38 | 42 | 40 | 89 | 76 | 73 | 65 |
| 52CL | FRL | 61 | 148 | 91 | 99 | 130 | 110 | 100 | 91 |
| 52CL | FRH | 78 | 151 | 79 | 80 | 65 | 72 | 86 | 78 |
| 52CL | FCL | 105 | 89 | 93 | 44 | 45 | 106 | 85 | 85 |
| 52CL | FCH | 104 | 81 | 16 | 63 | 26 | 80 | 66 | 64 |
| 52CL | FLL | 103 | 103 | 75 | 85 | 106 | 61 | 106 | 77 |
| 52CL | FLH | 67 | 31 | 60 | 80 | 55 | 63 | 51 | 75 |

## DEVIATION SCORES--RADIAL ERROR (CONT'D)

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 53CL | SRL | 55 | 63 | 67 | 68 | 55 | 59 | 58 | 64 |
| 53CL | SRH | 93 | 97 | 90 | 91 | 82 | 106 | 129 | 117 |
| 53CL | SCL | 41 | 46 | 50 | 47 | 48 | 57 | 65 | 98 |
| 53CL | SCH | 79 | 117 | 83 | 75 | 121 | 126 | 133 | 96 |
| 53CL | SLL | 87 | 69 | 71 | 67 | 85 | 83 | 81 | 98 |
| 53CL | SLH | 71 | 89 | 83 | 98 | 82 | 90 | 97 | 118 |
| 53CL | FRL | 87 | 55 | 60 | 59 | 18 | 39 | 13 | 60 |
| 53CL | FRH | 65 | 40 | 40 | 26 | 29 | 25 | 16 | 11 |
| 53CL | FCL | 24 | 80 | 45 | 28 | 28 | 44 | 47 | 41 |
| 53CL | FCH | 35 | 23 | 18 | 20 | 0 | 26 | 0 | 41 |
| 53CL | FLL | 56 | 55 | 61 | 64 | 51 | 44 | 27 | 51 |
| 53CL | FLH | 35 | 0 | 0 | 31 | 0 | 13 | 15 | 25 |
| 54CL | SRL | 25 | 24 | 20 | 16 | 0 | 0 | 11 | 9 |
| 54CL | SRH | 74 | 67 | 52 | 44 | 57 | 63 | 81 | 64 |
| 54CL | SCL | 42 | 11 | 13 | 7 | 0 | 0 | 0 | 0 |
| 54CL | SCH | 113 | 74 | 56 | 47 | 53 | 50 | 45 | 25 |
| 54CL | SLL | 72 | 24 | 52 | 64 | 33 | 22 | 0 | 29 |
| 54CL | SLH | 98 | 95 | 65 | 43 | 52 | 42 | 41 | 33 |
| 54CL | FRL | 96 | 67 | 70 | 78 | 19 | 42 | 60 | 57 |
| 54CL | FRH | 68 | 50 | 51 | 30 | 41 | 53 | 40 | 30 |
| 54CL | FCL | 94 | 60 | 72 | 60 | 71 | 41 | 3 | 32 |
| 54CL | FCH | 40 | 36 | 25 | 14 | 0 | 25 | 36 | 30 |
| 54CL | FLL | 77 | 49 | 58 | 51 | 54 | 47 | 44 | 6 |
| 54CL | FLH | 20 | 49 | 35 | 50 | 38 | 41 | 40 | 38 |

# DEVIATION SCORES--LATERAL

| SUB-JECT ID | CONDI-TION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 01JH | SRL | 1R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01JH | SRH | 0 | 0 | 8R | 0 | 17R | 0 | 0 | 0 |
| 01JH | SCL | 41R | 0 | 7R | 0 | 19R | 0 | 0 | 0 |
| 01JH | SCH | 0 | 0 | 9R | 0 | 18R | 1R | 4R | 5R |
| 01JH | SLL | 9R | 11R | 0 | 0 | 0 | 0 | 10R | 4R |
| 01JH | SLH | 16R | 3R | 5R | 0 | 0 | 0 | 0 | 0 |
| 01JH | FRL | 14R | 12R | 7R | 0 | 16R | 23R | 2R | 9R |
| 01JH | FRH | 55R | 5R | 0 | 54R | 13R | 58R | 16R | 19R |
| 01JH | FCL | 21R | 15R | 0 | 0 | 35R | 29R | 0 | 14R |
| 01JH | FCH | 28R | 14R | 4R | 0 | 0 | 0 | 11R | 8R |
| 01JH | FLL | 10R | 19R | 23R | 0 | 1R | 12R | 10R | 11R |
| 01JH | FLH | 0 | 0 | 0 | 0 | 4R | 0 | 13R | 0 |
| 02JH | SRL | 0 | 18R | 1R | 0 | 0 | 0 | 0 | 0 |
| 02JH | SRH | 0 | 24R | 4R | 2R | 3R | 0 | 0 | 4R |
| 02JH | SCL | 9R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02JH | SCH | 0 | 0 | 7R | 0 | 0 | 1R | 0 | 0 |
| 02JH | SLL | 0 | 12R | 0 | 0 | 1R | 10R | 23R | 7R |
| 02JH | SLH | 0 | 1R | 0 | 6R | 5R | 0 | 0 | 0 |
| 02JH | FRL | 2R | 0 | 0 | 21R | 33R | 18R | 34R | 16R |
| 02JH | FRH | 35R | 37R | 20R | 25R | 51R | 30R | 9R | 30R |
| 02JH | FCL | 3R | 3R | 8R | 0 | 60R | 6R | 0 | 11R |
| 02JH | FCH | 10R | 0 | 15R | 5R | 12R | 29R | 12R | 12R |
| 02JH | FLL | 9R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02JH | FLH | 0 | 0 | 0 | 2L | 0 | 0 | 0 | 0 |
| 03JH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03JH | SRH | 4R | 30R | 14R | 12R | 28R | 10R | 0 | 0 |
| 03JH | SCL | 5R | 0 | 0 | 0 | 0 | 0 | 0 | 1R |
| 03JH | SCH | 0 | 0 | 24R | 3R | 0 | 0 | 0 | 0 |
| 03JH | SLL | 0 | 0 | 0 | 7R | 0 | 28R | 0 | 23R |
| 03JH | SLH | 6R | 7R | 3R | 3R | 0 | 0 | 7R | 0 |
| 03JH | FRL | 37R | 10R | 27R | 25R | 61R | 11R | 11R | 17R |
| 03JH | FRH | 15R | 25R | 40R | 37R | 28R | 29R | 30R | 63R |
| 03JH | FCL | 1R | 1R | 11R | 3R | 0 | 3R | 0 | 4R |
| 03JH | FCH | 12R | 14R | 0 | 7R | 0 | 0 | 22R | 0 |
| 03JH | FLL | 10R | 0 | 0 | 0 | 14R | 0 | 0 | 0 |
| 03JH | FLH | 16R | 1R | 0 | 0 | 0 | 0 | 3R | 0 |
| 04JH | SRL | 1R | 4R | 0 | 0 | 0 | 0 | 0 | 0 |
| 04JH | SRH | 8R | 6R | 0 | 0 | 0 | 1R | 0 | 0 |
| 04JH | SCL | 2R | 10R | 0 | 0 | 0 | 0 | 8R | 0 |
| 04JH | SCH | 1R | 3R | 0 | 3R | 0 | 0 | 0 | 17R |
| 04JH | SLL | 5R | 0 | 0 | 9R | 20R | 18R | 10R | 12L |
| 04JH | SLH | 0 | 0 | 0 | 0 | 9R | 1R | 12R | 0 |
| 04JH | FRL | 1R | 0 | 0 | 0 | 6R | 3R | 0 | 8R |
| 04JH | FRH | 13R | 8R | 10R | 7R | 8R | 12R | 0 | 0 |
| 04JH | FCL | 0 | 29R | 20R | 9R | 0 | 7R | 0 | 6R |
| 04JH | FCH | 19R | 0 | 5R | 4R | 0 | 0 | 8R | 0 |
| 04JH | FLL | 0 | 2R | 0 | 12R | 3R | 30R | 33R | 15R |
| 04JH | FLH | 0 | 0 | 0 | 0 | 2R | 0 | 8R | 8R |

# DEVIATION SCORES--LATERAL

| SUB-JECT ID | CONDI-TION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 05JH | SRL | 1R | 0 | 31R | 12R | 42R | 0 | 3R | 12R |
| 05JH | SRH | 11R | 9R | 9R | 1R | 6R | 13R | 7R | 7R |
| 05JH | SCL | 4R | 23R | 0 | 0 | 0 | 5R | 1R | 4R |
| 05JH | SCH | 12R | 3R | 9R | 0 | 0 | 0 | 0 | 3R |
| 05JH | SLL | 5R | 2R | 3R | 15R | 0 | 8R | 6R | 5R |
| 05JH | SLH | 0 | 1R | 0 | 0 | 5R | 0 | 4R | 0 |
| 05JH | FRL | 11R | 10R | 33R | 8R | 19R | 15R | 2R | 14R |
| 05JH | FRH | 26R | 58R | 37R | 18R | 20R | 35R | 2R | 28R |
| 05JH | FCL | 30R | 35R | 9R | 1R | 25R | 6R | 0 | 15R |
| 05JH | FCH | 9R | 15R | 22R | 0 | 0 | 0 | 0 | 0 |
| 05JH | FLL | 13R | 2R | 0 | 0 | 0 | 0 | 0 | 0 |
| 05JH | FLH | 3R | 0 | 3R | 0 | 0 | 0 | 0 | 0 |
| 06JH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06JH | SRH | 0 | 4R | 0 | 0 | 0 | 0 | 0 | 0 |
| 06JH | SCL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06JH | SCH | 12R | 0 | 9R | 0 | 0 | 0 | 0 | 0 |
| 06JH | SLL | 51R | 14R | 9R | 30R | 18R | 31R | 35R | 27R |
| 06JH | SLH | 0 | 0 | 0 | 15R | 0 | 6R | 28R | 7R |
| 06JH | FRL | 5R | 0 | 1R | 0 | 8R | 0 | 4R | 0 |
| 06JH | FRH | 45R | 24R | 6R | 0 | 18R | 11R | 0 | 14R |
| 06JH | FCL | 0 | 32R | 13R | 3R | 0 | 0 | 0 | 0 |
| 06JH | FCH | 19R | 0 | 5R | 0 | 17R | 0 | 4R | 6R |
| 06JH | FLL | 16R | 19R | 17R | 0 | 12R | 29R | 0 | 12R |
| 06JH | FLH | 0 | 24R | 0 | 0 | 0 | 0 | 0 | 0 |
| 07JH | SRL | 0 | 3R | 0 | 0 | 0 | 0 | 0 | 0 |
| 07JH | SRH | 16R | 16R | 0 | 0 | 0 | 0 | 0 | 0 |
| 07JH | SCL | 0 | 0 | 0 | 0 | 0 | 0 | 1R | 0 |
| 07JH | SCH | 0 | 0 | 0 | 16R | 0 | 0 | 0 | 0 |
| 07JH | SLL | 0 | 0 | 0 | 0 | 0 | 7R | 0 | 0 |
| 07JH | SLH | 21R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07JH | FRL | 31R | 30R | 21R | 18R | 23R | 1R | 9R | 32R |
| 07JH | FRH | 40R | 22R | 20R | 24R | 22R | 16R | 2R | 14R |
| 07JH | FCL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07JH | FCH | 3R | 0 | 0 | 0 | 4R | 0 | 23R | 0 |
| 07JH | FLL | 6R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07JH | FLH | 0 | 0 | 0 | 0 | 8R | 0 | 0 | 0 |
| 08JH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3R |
| 08JH | SRH | 16R | 16R | 9R | 1R | 17R | 11R | 0 | 0 |
| 08JH | SCL | 16R | 3R | 0 | 0 | 0 | 0 | 0 | 0 |
| 08JH | SCH | 0 | 0 | 0 | 0 | 0 | 4R | 0 | 6R |
| 08JH | SLL | 8R | 0 | 0 | 0 | 10R | 0 | 0 | 0 |
| 08JH | SLH | 0 | 0 | 0 | 0 | 0 | 9R | 0 | 0 |
| 08JH | FRL | 18R | 31R | 31R | 21R | 44R | 27R | 51R | 42R |
| 08JH | FRH | 8R | 26R | 30R | 28R | 35R | 62R | 20R | 41R |
| 08JH | FCL | 3R | 0 | 9R | 0 | 28R | 6R | 3R | 22R |
| 08JH | FCH | 1R | 12R | 11R | 0 | 13R | 27R | 16R | 2R |
| 08JH | FLL | 0 | 0 | 0 | 0 | 0 | 1R | 0 | 0 |
| 08JH | FLH | 6R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# DEVIATION SCORES--LATERAL

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 09JH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11R |
| 09JH | SRH | 9R | 14R | 15R | 9R | 0 | 7R | 0 | 4R |
| 09JH | SCL | 0 | 0 | 1R | 0 | 0 | 0 | 0 | 12R |
| 09JH | SCH | 0 | 0 | 1R | 19R | 0 | 0 | 0 | 0 |
| 09JH | SLL | 3R | 20R | 11R | 3R | 0 | 5R | 0 | 0 |
| 09JH | SLH | 1R | 0 | 0 | 0 | 3R | 0 | 0 | 0 |
| 09JH | FRL | 25R | 24R | 12R | 1R | 4R | 12R | 11R | 11R |
| 09JH | FRH | 28R | 20R | 14R | 22R | 13R | 18R | 18R | 11R |
| 09JH | FCL | 7R | 6R | 0 | 10R | 11R | 7R | 17R | 0 |
| 09JH | FCH | 31R | 24R | 5R | 5R | 8R | 12R | 0 | 4R |
| 09JH | FLL | 16R | 12R | 12R | 0 | 0 | 0 | 0 | 0 |
| 09JH | FLH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10JL | SRL | 17R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10JL | SRH | 1R | 29R | 27R | 0 | 26R | 44R | 43R | 0 |
| 10JL | SCL | 47R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10JL | SCH | 0 | 0 | 0 | 5R | 0 | 0 | 0 | 0 |
| 10JL | SLL | 0 | 12R | 3R | 17R | 21R | 3R | 10R | 27R |
| 10JL | SLH | 0 | 0 | 0 | 9R | 0 | 0 | 13R | 0 |
| 10JL | FRL | 0 | 0 | 27R | 25R | 24R | 0 | 8R | 31R |
| 10JL | FRH | 47R | 6R | 0 | 22R | 25R | 21R | 34R | 25R |
| 10JL | FCL | 30R | 11R | 0 | 0 | 10R | 36R | 0 | 3R |
| 10JL | FCH | 0 | 14R | 0 | 41R | 0 | 0 | 0 | 8R |
| 10JL | FLL | 0 | 0 | 0 | 23R | 0 | 0 | 15R | 0 |
| 10JL | FLH | 13R | 2R | 10R | 0 | 13R | 47R | 0 | 4R |
| 11JL | SRL | 0 | 0 | 0 | 2R | 38R | 0 | 0 | 11R |
| 11JL | SRH | 0 | 7R | 1R | 13R | 6R | 0 | 19R | 9R |
| 11JL | SCL | 0 | 3R | 0 | 3R | 1R | 6R | 12R | 0 |
| 11JL | SCH | 0 | 11R | 3R | 0 | 0 | 16R | 13R | 0 |
| 11JL | SLL | 13R | 0 | 0 | 19R | 0 | 0 | 4R | 0 |
| 11JL | SLH | 14R | 0 | 0 | 0 | 2R | 0 | 49R | 0 |
| 11JL | FRL | 3R | 24R | 23R | 29R | 13R | 10R | 47R | 22R |
| 11JL | FRH | 77R | 20R | 65R | 62R | 21R | 10R | 20R | 9R |
| 11JL | FCL | 1R | 5R | 0 | 12R | 14R | 14R | 0 | 0 |
| 11JL | FCH | 3R | 0 | 0 | 0 | 0 | 11R | 0 | 0 |
| 11JL | FLL | 6R | 0 | 0 | 0 | 0 | 24R | 0 | 15R |
| 11JL | FLH | 0 | 15R | 25R | 2R | 29R | 0 | 11R | 39R |
| 12JL | SRL | 0 | 2R | 0 | 3R | 3R | 10R | 0 | 0 |
| 12JL | SRH | 4R | 5R | 2R | 0 | 0 | 8R | 9R | 7R |
| 12JL | SCL | 0 | 8R | 0 | 0 | 0 | 0 | 1R | 0 |
| 12JL | SCH | 0 | 0 | 0 | 0 | 1R | 0 | 5R | 0 |
| 12JL | SLL | 0 | 0 | 0 | 3R | 0 | 0 | 0 | 0 |
| 12JL | SLH | 0 | 0 | 0 | 0 | 3R | 1R | 0 | 0 |
| 12JL | FRL | 42R | 43R | 16R | 34R | 41R | 38R | 16R | 37R |
| 12JL | FRH | 36R | 46R | 58R | 21R | 46R | 43R | 45R | 42R |
| 12JL | FCL | 0 | 2R | 0 | 39R | 10R | 0 | 0 | 0 |
| 12JL | FCH | 0 | 7R | 0 | 0 | 32R | 0 | 39R | 0 |
| 12JL | FLL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12JL | FLH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# DEVIATION SCORES--LATERAL

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 13JL | SRL | 0 | 0 | 2R | 0 | 0 | 0 | 0 | 0 |
| 13JL | SRH | 10R | 47R | 14R | 30R | 3R | 0 | 0 | 3R |
| 13JL | SCL | 0 | 0 | 5R | 0 | 0 | 2R | 0 | 0 |
| 13JL | SCH | 0 | 0 | 0 | 0 | 3R | 0 | 14R | 5R |
| 13JL | SLL | 0 | 0 | 0 | 0 | 1R | 0 | 0 | 0 |
| 13JL | SLH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13JL | FRL | 33R | 31R | 47R | 10R | 30R | 33R | 51R | 29R |
| 13JL | FRH | 40R | 45R | 61R | 69R | 30R | 53R | 11R | 6R |
| 13JL | FCL | 0 | 28R | 0 | 0 | 0 | 6R | 0 | 0 |
| 13JL | FCH | 0 | 2R | 0 | 0 | 0 | 0 | 0 | 4L |
| 13JL | FLL | 0 | 0 | 0 | 0 | 0 | 1R | 0 | 10R |
| 13JL | FLH | 0 | 41R | 0 | 10R | 0 | 6R | 0 | 0 |
| 14JL | SRL | 0 | 0 | 0 | 0 | 2R | 0 | 4R | 0 |
| 14JL | SRH | 0 | 1R | 5R | 0 | 0 | 0 | 0 | 0 |
| 14JL | SCL | 4R | 0 | 9R | 0 | 0 | 0 | 0 | 0 |
| 14JL | SCH | 0 | 0 | 0 | 0 | 8R | 0 | 0 | 0 |
| 14JL | SLL | 0 | 0 | 0 | 6R | 0 | 0 | 1R | 1R |
| 14JL | SLH | 8R | 11R | 0 | 0 | 0 | 0 | 0 | 0 |
| 14JL | FRL | 3R | 2R | 7R | 17R | 4R | 5R | 0 | 0 |
| 14JL | FRH | 8R | 33R | 52R | 20R | 13R | 16R | 22R | 9R |
| 14JL | FCL | 5R | 0 | 0 | 0 | 0 | 0 | 0 | 17R |
| 14JL | FCH | 13R | 35R | 22R | 0 | 0 | 17R | 11R | 0 |
| 14JL | FLL | 1R | 9R | 0 | 0 | 6R | 0 | 0 | 0 |
| 14JL | FLH | 9R | 10R | 25R | 0 | 0 | 9R | 0 | 21R |
| 15JL | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13R |
| 15JL | SRH | 0 | 0 | 0 | 28R | 0 | 0 | 0 | 0 |
| 15JL | SCL | 0 | 18R | 2R | 10R | 15R | 7R | 0 | 1R |
| 15JL | SCH | 2R | 0 | 9R | 30R | 0 | 10R | 0 | 11R |
| 15JL | SLL | 13R | 0 | 15R | 0 | 28R | 19R | 22R | 11R |
| 15JL | SLH | 2R | 4R | 4R | 7R | 26R | 6R | 9R | 0 |
| 15JL | FRL | 40R | 2R | 30R | 20R | 7R | 20R | 19R | 20R |
| 15JL | FRH | 12R | 27R | 24R | 34R | 38R | 21R | 43R | 6R |
| 15JL | FCL | 0 | 1R | 0 | 12R | 0 | 0 | 6R | 0 |
| 15JL | FCH | 0 | 0 | 1R | 0 | 6R | 0 | 15R | 0 |
| 15JL | FLL | 9R | 3R | 0 | 2R | 2R | 6R | 7R | 7R |
| 15JL | FLH | 50R | 0 | 16R | 0 | 44R | 8R | 0 | 0 |
| 16JL | SRL | 0 | 0 | 0 | 8R | 0 | 1L | 0 | 0 |
| 16JL | SRH | 3R | 2R | 0 | 0 | 0 | 0 | 0 | 0 |
| 16JL | SCL | 0 | 0 | 0 | 0 | 10R | 21L | 9L | 0 |
| 16JL | SCH | 0 | 3R | 0 | 11R | 0 | 8R | 0 | 0 |
| 16JL | SLL | 0 | 6R | 0 | 0 | 0 | 10R | 0 | 0 |
| 16JL | SLH | 0 | 0 | 0 | 10R | 7R | 0 | 16R | 0 |
| 16JL | FRL | 5R | 5R | 0 | 6R | 5R | 1R | 8R | 4R |
| 16JL | FRH | 50R | 30R | 25R | 32R | 34R | 1R | 31R | 31R |
| 16JL | FCL | 15R | 0 | 0 | 0 | 0 | 7L | 5R | 0 |
| 16JL | FCH | 16R | 17R | 0 | 6R | 0 | 0 | 24L | 10L |
| 16JL | FLL | 4R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16JL | FLH | 0 | 14R | 0 | 0 | 0 | 0 | 0 | 0 |

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 17JL | SRL | 0 | 0 | 11R | 0 | 0 | 0 | 0 | 0 |
| 17JL | SRH | 24R | 23R | 21R | 24R | 23R | 4R | 13R | 2R |
| 17JL | SCL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17JL | SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17JL | SLL | 0 | 0 | 0 | 0 | 9R | 0 | 12R | 0 |
| 17JL | SLH | 0 | 3R | 0 | 0 | 10R | 0 | 0 | 0 |
| 17JL | FRL | 30R | 49R | 25R | 32R | 26R | 24R | 36R | 27R |
| 17JL | FRH | 40R | 45R | 45R | 34R | 46R | 26R | 18R | 22R |
| 17JL | FCL | 10R | 34R | 0 | 0 | 26R | 0 | 9R | 3R |
| 17JL | FCH | 0 | 3R | 0 | 1R | 0 | 0 | 0 | 7R |
| 17JL | FLL | 0 | 0 | 12R | 0 | 19R | 0 | 0 | 0 |
| 17JL | FLH | 12R | 0 | 0 | 24R | 13R | 14R | 30R | 11R |
| 18JL | SRL | 8R | 0 | 0 | 0 | 0 | 0 | 10R | 23R |
| 18JL | SRH | 22R | 16R | 29R | 16R | 22R | 16R | 0 | 8R |
| 18JL | SCL | 16R | 9R | 0 | 3R | 0 | 13R | 0 | 0 |
| 18JL | SCH | 18R | 0 | 0 | 4R | 0 | 8R | 0 | 0 |
| 18JL | SLL | 21R | 10R | 10R | 16R | 11R | 0 | 0 | 12R |
| 18JL | SLH | 0 | 0 | 0 | 0 | 0 | 0 | 9R | 2R |
| 18JL | FRL | 33R | 30R | 21R | 27R | 31R | 43R | 31R | 20R |
| 18JL | FRH | 73R | 35R | 34R | 37R | 17R | 34R | 37R | 45R |
| 18JL | FCL | 60R | 10R | 0 | 0 | 0 | 18R | 0 | 6R |
| 18JL | FCH | 35R | 19R | 95R | 5R | 4R | 3R | 0 | 20R |
| 18JL | FLL | 13R | 0 | 9R | 8R | 0 | 0 | 0 | 0 |
| 18JL | FLH | 7R | 0 | 1R | 0 | 0 | 0 | 0 | 0 |
| 19HH | SRL | 0 | 4R | 0 | 9R | 0 | 0 | 0 | 0 |
| 19HH | SRH | 0 | 0 | 0 | 2R | 0 | 0 | 0 | 0 |
| 19HH | SCL | 5R | 6R | 0 | 1R | 0 | 0 | 0 | 0 |
| 19HH | SCH | 11R | 11R | 2R | 0 | 0 | 0 | 0 | 0 |
| 19HH | SLL | 21R | 0 | 14R | 0 | 0 | 1R | 0 | 0 |
| 19HH | SLH | 40R | 0 | 10R | 0 | 9R | 0 | 8R | 2R |
| 19HH | FRL | 27R | 0 | 0 | 10R | 3R | 14R | 9R | 9R |
| 19HH | FRH | 22R | 31R | 7R | 24R | 35R | 11R | 20R | 13R |
| 19HH | FCL | 0 | 0 | 14R | 0 | 0 | 0 | 0 | 0 |
| 19HH | FCH | 10R | 3R | 27R | 0 | 0 | 21R | 9R | 0 |
| 19HH | FLL | 11R | 0 | 28R | 0 | 0 | 0 | 7R | 12R |
| 19HH | FLH | 0 | 0 | 17R | 8R | 0 | 0 | 0 | 5R |
| 20HH | SRL | 1R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20HH | SRH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20HH | SCL | 2R | 0 | 3R | 0 | 0 | 11R | 0 | 0 |
| 20HH | SCH | 24R | 0 | 18R | 3L | 0 | 0 | 0 | 0 |
| 20HH | SLL | 38R | 17R | 3R | 9R | 4R | 3R | 0 | 10R |
| 20HH | SLH | 1R | 11R | 0 | 0 | 0 | 0 | 0 | 0 |
| 20HH | FRL | 0 | 12R | 0 | 2R | 0 | 0 | 1R | 0 |
| 20HH | FRH | 23R | 7R | 44R | 4R | 5R | 0 | 0 | 10R |
| 20HH | FCL | 0 | 21R | 53R | 12R | 12R | 0 | 0 | 15R |
| 20HH | FCH | 8R | 3R | 40R | 0 | 0 | 6R | 20R | 5R |
| 20HH | FLL | 0 | 7R | 15R | 0 | 0 | 0 | 0 | 0 |
| 20HH | FLH | 30R | 0 | 0 | 0 | 0 | 0 | 11R | 0 |

# DEVIATION SCORES--LATERAL

| SUB-JECT ID | CONDI-TION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 21HH | SRL | 0 | 0 | 0 | 0 | 9L | 0 | 0 | 0 |
| 21HH | SRH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21HH | SCL | 9R | 20R | 25R | 5R | 0 | 0 | 18R | 0 |
| 21HH | SCH | 32R | 27R | 4R | 0 | 1R | 10R | 0 | 0 |
| 21HH | SLL | 27R | 0 | 7R | 14R | 5R | 10R | 0 | 14R |
| 21HH | SLH | 7R | 4R | 23R | 0 | 0 | 0 | 0 | 0 |
| 21HH | FRL | 9R | 3R | 10R | 0 | 0 | 0 | 0 | 0 |
| 21HH | FRH | 8R | 3R | 22R | 2R | 0 | 0 | 21R | 6R |
| 21HH | FCL | 12R | 0 | 0 | 0 | 0 | 0 | 22R | 0 |
| 21HH | FCH | 1R | 0 | 10R | 14R | 0 | 0 | 5R | 20R |
| 21HH | FLL | 5L | 0 | 0 | 0 | 16R | 0 | 10R | 0 |
| 21HH | FLH | 0 | 0 | 0 | 0 | 6R | 6R | 0 | 0 |
| 22HH | SRL | 0 | 0 | 0 | 2R | 0 | 0 | 7R | 0 |
| 22HH | SRH | 16R | 14R | 10R | 10R | 0 | 0 | 0 | 0 |
| 22HH | SCL | 0 | 0 | 0 | 20R | 0 | 0 | 0 | 0 |
| 22HH | SCH | 9R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22HH | SLL | 15R | 8R | 4R | 15R | 0 | 0 | 0 | 8R |
| 22HH | SLH | 12R | 0 | 0 | 0 | 0 | 0 | 3R | 0 |
| 22HH | FRL | 10R | 3R | 19R | 8R | 9R | 0 | 29R | 0 |
| 22HH | FRH | 27R | 23R | 38R | 31R | 25R | 16R | 2R | 13R |
| 22HH | FCL | 14R | 31R | 29R | 5R | 12R | 5R | 0 | 9R |
| 22HH | FCH | 34R | 32R | 0 | 0 | 4R | 2R | 1R | 0 |
| 22HH | FLL | 32R | 17R | 0 | 0 | 0 | 0 | 7R | 0 |
| 22HH | FLH | 10R | 9R | 34R | 0 | 0 | 0 | 0 | 0 |
| 23HH | SRL | 6R | 0 | 0 | 7R | 0 | 0 | 0 | 0 |
| 23HH | SRH | 12R | 20R | 8R | 15R | 7R | 3R | 0 | 0 |
| 23HH | SCL | 4R | 1R | 0 | 0 | 0 | 1R | 0 | 0 |
| 23HH | SCH | 0 | 0 | 0 | 8R | 5R | 0 | 0 | 0 |
| 23HH | SLL | 9R | 0 | 5R | 0 | 0 | 2R | 11R | 11R |
| 23HH | SLH | 8R | 14R | 8R | 0 | 9R | 0 | 21R | 1R |
| 23HH | FRL | 14R | 24R | 28R | 35R | 51R | 21R | 38R | 11R |
| 23HH | FRH | 33R | 42R | 20R | 30R | 32R | 0 | 5R | 0 |
| 23HH | FCL | 45R | 0 | 20R | 18R | 40R | 8R | 12R | 9R |
| 23HH | FCH | 33R | 25R | 23R | 27R | 5R | 32R | 18R | 18R |
| 23HH | FLL | 0 | 10R | 0 | 0 | 0 | 0 | 0 | 4R |
| 23HH | FLH | 0 | 0 | 0 | 0 | 0 | 0 | 18R | 0 |
| 24HH | SRL | 0 | 0 | 0 | 1R | 2R | 0 | 0 | 3R |
| 24HH | SRH | 10R | 0 | 0 | 0 | 0 | 0 | 0 | 2R |
| 24HH | SCL | 0 | 0 | 0 | 8R | 0 | 6R | 0 | 0 |
| 24HH | SCH | 12R | 0 | 4R | 0 | 0 | 0 | 0 | 0 |
| 24HH | SLL | 35R | 10R | 0 | 21R | 0 | 0 | 23R | 0 |
| 24HH | SLH | 20R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24HH | FRL | 19R | 0 | 7R | 0 | 0 | 0 | 0 | 0 |
| 24HH | FRH | 2R | 12R | 9R | 0 | 16R | 19R | 26R | 8R |
| 24HH | FCL | 6R | 6R | 27R | 8R | 3R | 0 | 0 | 0 |
| 24HH | FCH | 10R | 8R | 0 | 8R | 30R | 8R | 0 | 0 |
| 24HH | FLL | 31R | 10R | 18R | 18R | 3R | 0 | 13R | 0 |
| 24HH | FLH | 30R | 12R | 10R | 33R | 0 | 10L | 0 | 3L |

# DEVIATION SCORES--LATERAL

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 25HH | SRL | 0 | 0 | 0 | 0 | 7R | 0 | 0 | 0 |
| 25HH | SRH | 0 | 0 | 0 | 1R | 5R | 0 | 0 | 0 |
| 25HH | SCL | 7R | 13R | 0 | 2R | 8R | 0 | 0 | 0 |
| 25HH | SCH | 7R | 0 | 14R | 9R | 0 | 0 | 0 | 0 |
| 25HH | SLL | 0 | 11R | 0 | 0 | 0 | 0 | 4R | 0 |
| 25HH | SLH | 0 | 0 | 0 | 1R | 2R | 0 | 4R | 0 |
| 25HH | FRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25HH | FRH | 0 | 6R | 5R | 0 | 8R | 5R | 14R | 0 |
| 25HH | FCL | 4R | 0 | 37R | 0 | 0 | 0 | 0 | 0 |
| 25HH | FCH | 0 | 0 | 0 | 4R | 0 | 0 | 5R | 0 |
| 25HH | FLL | 0 | 0 | 0 | 0 | 3R | 4R | 1R | 0 |
| 25HH | FLH | 0 | 0 | 6R | 0 | 0 | 0 | 0 | 1R |
| 26HH | SRL | 0 | 0 | 0 | 0 | 0 | 1R | 0 | 0 |
| 26HH | SRH | 0 | 0 | 3R | 6R | 0 | 0 | 4R | 0 |
| 26HH | SCL | 11R | 3R | 0 | 43R | 2R | 2R | 0 | 9R |
| 26HH | SCH | 5R | 4R | 23R | 0 | 0 | 0 | 12R | 0 |
| 26HH | SLL | 22R | 0 | 12R | 0 | 0 | 36R | 8R | 22R |
| 26HH | SLH | 0 | 0 | 0 | 0 | 0 | 21R | 0 | 16R |
| 26HH | FRL | 0 | 12R | 6R | 6R | 32R | 30R | 8R | 6R |
| 26HH | FRH | 13R | 32R | 35R | 29R | 20R | 32R | 25R | 26R |
| 26HH | FCL | 17R | 4R | 39R | 0 | 1R | 0 | 9R | 0 |
| 26HH | FCH | 31R | 2R | 15R | 6R | 0 | 15R | 10R | 14R |
| 26HH | FLL | 33R | 0 | 12R | 0 | 0 | 0 | 3R | 6R |
| 26HH | FLH | 0 | 0 | 0 | 0 | 0 | 30R | 0 | 0 |
| 27HH | SRL | 10R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27HH | SRH | 0 | 0 | 1R | 0 | 0 | 0 | 0 | 0 |
| 27HH | SCL | 0 | 2R | 0 | 0 | 0 | 0 | 0 | 0 |
| 27HH | SCH | 0 | 14R | 0 | 0 | 0 | 0 | 0 | 16R |
| 27HH | SLL | 9R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27HH | SLH | 18R | 0 | 18R | 0 | 0 | 0 | 0 | 0 |
| 27HH | FRL | 0 | 23R | 1R | 0 | 0 | 0 | 0 | 0 |
| 27HH | FRH | 0 | 11R | 16R | 21R | 7R | 2R | 36R | 13R |
| 27HH | FCL | 0 | 14R | 1R | 0 | 9R | 6R | 0 | 4R |
| 27HH | FCH | 4R | 22R | 0 | 0 | 4R | 0 | 0 | 0 |
| 27HH | FLL | 0 | 0 | 0 | 4R | 0 | 0 | 0 | 0 |
| 27HH | FLH | 0 | 12R | 21R | 0 | 0 | 0 | 0 | 0 |
| 28HL | SRL | 12R | 2R | 0 | 3R | 0 | 0 | 7R | 0 |
| 28HL | SRH | 1R | 6R | 17R | 22R | 0 | 0 | 0 | 0 |
| 28HL | SCL | 5R | 1R | 10R | 4R | 0 | 10R | 0 | 0 |
| 28HL | SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15R |
| 28HL | SLL | 0 | 16R | 0 | 0 | 0 | 0 | 0 | 0 |
| 28HL | SLH | 0 | 0 | 0 | 16L | 0 | 0 | 0 | 0 |
| 28HL | FRL | 60R | 32R | 15R | 27R | 18R | 25R | 19R | 5R |
| 28HL | FRH | 36R | 32R | 37R | 25R | 27R | 34R | 40R | 24R |
| 28HL | FCL | 20R | 0 | 6R | 4R | 0 | 7R | 0 | 15R |
| 28HL | FCH | 0 | 23R | 0 | 0 | 0 | 4R | 0 | 0 |
| 28HL | FLL | 0 | 9R | 0 | 3L | 0 | 0 | 0 | 0 |
| 28HL | FLH | 6L | 0 | 7L | 11L | 10L | 0 | 0 | 22L |

## DEVIATION SCORES--LATERAL

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 29HL | SRL | 5R | 10R | 0 | 0 | 0 | 0 | 0 | 0 |
| 29HL | SRH | 18R | 22R | 8R | 0 | 0 | 18R | 0 | 0 |
| 29HL | SCL | 2R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29HL | SCH | 15R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29HL | SLL | 7R | 5R | 0 | 0 | 0 | 0 | 0 | 0 |
| 29HL | SLH | 15R | 12R | 2R | 0 | 4R | 0 | 0 | 0 |
| 29HL | FRL | 18R | 22R | 25R | 29R | 19R | 20R | 22R | 19R |
| 29HL | FRH | 28R | 54R | 20R | 39R | 25R | 27R | 21R | 19R |
| 29HL | FCL | 3R | 15R | 0 | 4R | 0 | 13R | 0 | 0 |
| 29HL | FCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29HL | FLL | 0 | 0 | 0 | 0 | 5L | 4L | 1L | 0 |
| 29HL | FLH | 0 | 13R | 14L | 15L | 0 | 20L | 0 | 42L |
| 30HL | SRL | 15L | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30HL | SRH | 2R | 2L | 5R | 4R | 0 | 0 | 0 | 0 |
| 30HL | SCL | 6R | 2L | 6R | 23R | 0 | 13R | 0 | 0 |
| 30HL | SCH | 0 | 0 | 0 | 0 | 0 | 0 | 4R | 0 |
| 30HL | SLL | 7R | 16R | 11R | 0 | 19R | 26R | 0 | 11R |
| 30HL | SLH | 9R | 23R | 0 | 16R | 26R | 0 | 1R | 0 |
| 30HL | FRL | 1R | 0 | 0 | 0 | 0 | 0 | 13R | 0 |
| 30HL | FRH | 14R | 3R | 11L | 14R | 8L | 24R | 18R | 9R |
| 30HL | FCL | 0 | 0 | 38R | 0 | 0 | 4L | 0 | 0 |
| 30HL | FCH | 2R | 0 | 1R | 23R | 0 | 4R | 5R | 0 |
| 30HL | FLL | 3R | 0 | 14R | 0 | 5R | 9R | 6R | 6R |
| 30HL | FLH | 42R | 10R | 19L | 0 | 0 | 5L | 0 | 5L |
| 31HL | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31HL | SRH | 5R | 0 | 0 | 5R | 0 | 0 | 4R | 22R |
| 31HL | SCL | 0 | 0 | 22R | 9R | 0 | 0 | 0 | 0 |
| 31HL | SCH | 16R | 0 | 0 | 1R | 0 | 0 | 0 | 0 |
| 31HL | SLL | 0 | 12R | 4R | 0 | 0 | 0 | 0 | 0 |
| 31HL | SLH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31HL | FRL | 7R | 1R | 19R | 12R | 19R | 0 | 0 | 0 |
| 31HL | FRH | 25R | 57R | 6R | 2R | 20R | 27R | 27R | 51R |
| 31HL | FCL | 4R | 5R | 11R | 5R | 0 | 0 | 0 | 0 |
| 31HL | FCH | 4R | 3R | 0 | 0 | 0 | 0 | 0 | 10R |
| 31HL | FLL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31HL | FLH | 0 | 0 | 11L | 0 | 0 | 2R | 0 | 0 |
| 32HL | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 32HL | SRH | 0 | 5R | 0 | 0 | 0 | 0 | 0 | 0 |
| 32HL | SCL | 0 | 21R | 5R | 9R | 0 | 0 | 4R | 0 |
| 32HL | SCH | 1R | 14R | 3R | 0 | 0 | 0 | 21R | 0 |
| 32HL | SLL | 22R | 8R | 19R | 16R | 0 | 0 | 2R | 0 |
| 32HL | SLH | 0 | 8R | 13R | 27R | 0 | 0 | 14R | 3R |
| 32HL | FRL | 22R | 30R | 47R | 21R | 13R | 23R | 3R | 9R |
| 32HL | FRH | 50R | 64R | 11R | 31R | 48R | 30R | 13R | 0 |
| 32HL | FCL | 53R | 22R | 24R | 0 | 20R | 11R | 26R | 0 |
| 32HL | FCH | 25R | 25R | 49R | 0 | 17R | 0 | 16R | 7R |
| 32HL | FLL | 0 | 0 | 0 | 2R | 0 | 0 | 0 | 3R |
| 32HL | FLH | 0 | 3R | 0 | 4R | 0 | 0 | 0 | 0 |

# DEVIATION SCORES--LATERAL

| SUB- JECT ID | CONDI- TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 33HL | SRL | 16R | 18R | 9R | 11R | 0 | 12R | 20R | 0 |
| 33HL | SRH | 2R | 19R | 0 | 0 | 0 | 0 | 0 | 0 |
| 33HL | SCL | 1R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 33HL | SCH | 39R | 0 | 10R | 16R | 0 | 32R | 23L | 7L |
| 33HL | SLL | 19R | 27R | 0 | 11R | 8R | 12R | 9R | 0 |
| 33HL | SLH | 12R | 0 | 25R | 8R | 12R | 7R | 0 | 0 |
| 33HL | FRL | 19R | 25R | 17R | 10R | 11R | 0 | 0 | 0 |
| 33HL | FRH | 25R | 24R | 35R | 10R | 0 | 13R | 2R | 6R |
| 33HL | FCL | 26R | 0 | 0 | 12R | 50R | 0 | 1R | 0 |
| 33HL | FCH | 14R | 1R | 45R | 13R | 0 | 0 | 0 | 22R |
| 33HL | FLL | 15R | 17R | 4R | 5R | 0 | 0 | 0 | 0 |
| 33HL | FLH | 0 | 38R | 0 | 0 | 0 | 0 | 0 | 0 |
| 34HL | SRL | 29R | 0 | 6R | 0 | 0 | 0 | 8R | 7R |
| 34HL | SRH | 26R | 16R | 0 | 4R | 38R | 9R | 9R | 6R |
| 34HL | SCL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21R |
| 34HL | SCH | 0 | 20L | 12R | 8R | 18L | 9R | 0 | 8R |
| 34HL | SLL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 34HL | SLH | 0 | 0 | 0 | 0 | 10R | 0 | 0 | 4R |
| 34HL | FRL | 18R | 22R | 7R | 30R | 17R | 30R | 18R | 17R |
| 34HL | FRH | 26R | 18R | 16R | 19R | 32R | 33R | 42R | 70R |
| 34HL | FCL | 29R | 20R | 17R | 23R | 14L | 0 | 15R | 0 |
| 34HL | FCH | 1R | 15R | 9L | 13R | 24R | 40R | 8R | 13L |
| 34HL | FLL | 9L | 0 | 0 | 6L | 1L | 6L | 24L | 3L |
| 34HL | FLH | 11L | 17L | 0 | 0 | 16L | 5L | 0 | 80L |
| 35HL | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 35HL | SRH | 0 | 22R | 3R | 0 | 0 | 0 | 0 | 2R |
| 35HL | SCL | 0 | 19R | 11R | 0 | 0 | 0 | 0 | 0 |
| 35HL | SCH | 0 | 6R | 1L | 0 | 0 | 3R | 0 | 14L |
| 35HL | SLL | 0 | 4R | 17R | 0 | 0 | 3R | 4R | 0 |
| 35HL | SLH | 9R | 0 | 0 | 3R | 0 | 9R | 0 | 3R |
| 35HL | FRL | 20R | 26R | 25R | 13R | 22R | 19R | 21R | 10R |
| 35HL | FRH | 74R | 56R | 24R | 35R | 31R | 35R | 6R | 19R |
| 35HL | FCL | 26R | 0 | 5R | 2R | 0 | 0 | 6R | 0 |
| 35HL | FCH | 2R | 0 | 0 | 3L | 0 | 0 | 0 | 0 |
| 35HL | FLL | 0 | 4L | 0 | 0 | 0 | 0 | 0 | 0 |
| 35HL | FLH | 7L | 7L | 16L | 2R | 0 | 0 | 23L | 0 |
| 36HL | SRL | 0 | 0 | 6R | 2R | 0 | 0 | 0 | 0 |
| 36HL | SRH | 15R | 3R | 3R | 3R | 0 | 0 | 3R | 0 |
| 36HL | SCL | 1R | 7R | 2R | 5R | 0 | 0 | 0 | 0 |
| 36HL | SCH | 15R | 78R | 0 | 28R | 0 | 0 | 0 | 0 |
| 36HL | SLL | 4R | 1R | 0 | 22R | 0 | 3R | 0 | 0 |
| 36HL | SLH | 0 | 0 | 0 | 0 | 0 | 2R | 0 | 0 |
| 36HL | FRL | 14R | 18R | 8R | 10R | 12R | 5R | 0 | 1R |
| 36HL | FRH | 21R | 23R | 37R | 30R | 9R | 23R | 17R | 27R |
| 36HL | FCL | 24R | 12R | 4R | 37R | 0 | 0 | 21R | 0 |
| 36HL | FCH | 0 | 35R | 0 | 2L | 0 | 0 | 0 | 0 |
| 36HL | DLL | 0 | 0 | 0 | 2L | 0 | 0 | 0 | 0 |
| 36HL | FLH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# DEVIATION SCORES--LATERAL

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 37CH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 37CH | SRH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 37CH | SCL | 0 | 0 | 0 | 0 | 14R | 0 | 8R | 0 |
| 37CH | SCH | 0 | 0 | 0 | 0 | 4R | 0 | 0 | 0 |
| 37CH | SLL | 10R | 14R | 13R | 5R | 0 | 9R | 0 | 8R |
| 37CH | SLH | 0 | 0 | 4R | 0 | 0 | 0 | 0 | 0 |
| 37CH | FRL | 3R | 0 | 12R | 8R | 0 | 10R | 24R | 14R |
| 37CH | FRH | 18R | 12R | 6R | 10R | 1R | 12R | 17R | 12R |
| 37CH | FCL | 13R | 7R | 21R | 10R | 10R | 13R | 7R | 25R |
| 37CH | FCH | 0 | 10R | 0 | 9R | 12R | 7R | 12R | 19R |
| 37CH | FLL | 6R | 0 | 0 | 0 | 0 | 2R | 11R | 0 |
| 37CH | FLH | 0 | 0 | 0 | 23R | 2R | 0 | 5R | 16R |
| 38CH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 38CH | SRH | 1R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 38CH | SCL | 4R | 2R | 0 | 1R | 0 | 0 | 0 | 0 |
| 38CH | SCH | 3R | 0 | 0 | 0 | 0 | 0 | 1R | 0 |
| 38CH | SLL | 25R | 30R | 7R | 15R | 8R | 8R | 5R | 6R |
| 38CH | SLH | 11R | 17R | 22R | 25R | 26R | 13R | 17R | 25R |
| 38CH | FRL | 7R | 16R | 0 | 0 | 0 | 4R | 0 | 0 |
| 38CH | FRH | 0 | 1R | 24R | 18R | 30R | 10R | 0 | 33R |
| 38CH | FCL | 33R | 20R | 0 | 8R | 9R | 15R | 3R | 0 |
| 38CH | FCH | 7R | 6R | 12R | 0 | 0 | 5R | 5R | 0 |
| 38CH | FLL | 12R | 17R | 22R | 12R | 0 | 8R | 4R | 8R |
| 38CH | FLH | 10R | 21R | 21R | 16R | 5R | 10R | 10R | 15R |
| 39CH | SRL | 0 | 0 | 4R | 5R | 2R | 0 | 0 | 0 |
| 39CH | SRH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 39CH | SCL | 0 | 0 | 0 | 0 | 4R | 13R | 0 | 0 |
| 39CH | SCH | 0 | 10R | 0 | 0 | 9R | 14R | 0 | 0 |
| 39CH | SLL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 39CH | SLH | 0 | 0 | 0 | 6R | 0 | 0 | 0 | 0 |
| 39CH | FRL | 0 | 0 | 0 | 0 | 0 | 3R | 0 | 0 |
| 39CH | FRH | 12R | 31R | 26R | 0 | 23R | 27R | 18R | 7R |
| 39CH | FCL | 6R | 0 | 0 | 9R | 5R | 4R | 0 | 4R |
| 39CH | FCH | 4R | 3R | 4R | 3R | 3R | 3R | 3R | 3R |
| 39CH | FLL | 0 | 0 | 18R | 17R | 20R | 0 | 16R | 21R |
| 39CH | FLH | 0 | 0 | 0 | 8R | 0 | 0 | 0 | 0 |
| 40CH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 40CH | SRH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 40CH | SCL | 0 | 12R | 15R | 14R | 14R | 16R | 12R | 0 |
| 40CH | SCH | 0 | 8R | 0 | 0 | 0 | 0 | 0 | 0 |
| 40CH | SLL | 0 | 30R | 23R | 5R | 16R | 17R | 12R | 8R |
| 40CH | SLH | 5R | 2R | 7R | 13R | 20R | 37R | 15R | 0 |
| 40CH | FRL | 20R | 0 | 0 | 0 | 0 | 22R | 10R | 0 |
| 40CH | FRH | 10R | 3R | 16R | 22R | 17R | 5R | 2R | 0 |
| 40CH | FCL | 15R | 27R | 15R | 42R | 21R | 5R | 0 | 5R |
| 40CH | FCH | 4R | 5R | 6R | 0 | 6R | 8R | 0 | 1R |
| 40CH | FLL | 18R | 27R | 11R | 12R | 22R | 35R | 26R | 34R |
| 40CH | FLH | 2R | 10R | 0 | 0 | 0 | 0 | 6R | 14R |

## DEVIATION SCORES--LATERAL

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 41CH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 41CH | SRH | 11R | 0 | 0 | 0 | 6R | 0 | 0 | 2R |
| 41CH | SCL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 41CH | SCH | 8R | 6R | 0 | 2R | 0 | 0 | 0 | 0 |
| 41CH | SLL | 4R | 0 | 0 | 0 | 0 | 0 | 0 | 15R |
| 41CH | SLH | 0 | 0 | 0 | 0 | 5R | 1R | 0 | 0 |
| 41CH | FRL | 33R | 0 | 1R | 8R | 5R | 0 | 0 | 0 |
| 41CH | FRH | 4R | 15R | 2R | 1R | 3R | 2R | 3R | 10R |
| 41CH | FCL | 15R | 1R | 0 | 3R | 2R | 5R | 18R | 1R |
| 41CH | FCH | 15R | 0 | 0 | 0 | 0 | 10R | 39R | 0 |
| 41CH | FLL | 11R | 3R | 4R | 8R | 5R | 4R | 8R | 13R |
| 41CH | FLH | 17R | 1R | 0 | 0 | 3R | 3R | 0 | 0 |
| 42CH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 42CH | SRH | 16R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 42CH | SCL | 6R | 0 | 4R | 1R | 0 | 2R | 0 | 0 |
| 42CH | SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 42CH | SLL | 9R | 10R | 5R | 0 | 0 | 8R | 0 | 10R |
| 42CH | SLH | 0 | 0 | 0 | 1R | 0 | 0 | 1R | 0 |
| 42CH | FRL | 0 | 7R | 15R | 10R | 16R | 3R | 4R | 9R |
| 42CH | FRH | 7R | 5R | 11R | 6R | 8R | 13R | 15R | 8R |
| 42CH | FCL | 22R | 6R | 0 | 4R | 8R | 7R | 8R | 0 |
| 42CH | FCH | 1R | 0 | 0 | 0 | 4R | 0 | 0 | 0 |
| 42CH | FLL | 0 | 5R | 4R | 0 | 9R | 6R | 0 | 5R |
| 42CH | FLH | 0 | 0 | 0 | 0 | 7R | 0 | 0 | 0 |
| 43CH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13R |
| 43CH | SRH | 0 | 0 | 0 | 0 | 1R | 0 | 0 | 16R |
| 43CH | SCL | 1R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43CH | SCH | 0 | 0 | 0 | 0 | 0 | 2R | 0 | 13R |
| 43CH | SLL | 0 | 0 | 6R | 0 | 0 | 0 | 0 | 0 |
| 43CH | SLH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43CH | FRL | 3R | 5R | 15R | 20R | 0 | 21R | 6R | 7R |
| 43CH | FRH | 50R | 16R | 22R | 29R | 28R | 37R | 18R | 21R |
| 43CH | FCL | 30R | 10R | 0 | 4R | 11R | 5R | 26R | 40R |
| 43CH | FCH | 61R | 40R | 56R | 25R | 39R | 31R | 37R | 50R |
| 43CH | FLL | 15R | 8R | 16R | 23R | 0 | 4R | 5R | 12R |
| 43CH | FLH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28R |
| 44CH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 9R | 0 |
| 44CH | SRH | 3R | 2R | 1R | 1R | 2R | 0 | 0 | 0 |
| 44CH | SCL | 5R | 7R | 0 | 0 | 0 | 0 | 3L | 2R |
| 44CH | SCH | 0 | 0 | 0 | 0 | 0 | 0 | 6R | 0 |
| 44CH | SLL | 0 | 0 | 6R | 0 | 16R | 0 | 0 | 0 |
| 44CH | SLH | 0 | 7R | 0 | 0 | 0 | 0 | 0 | 12R |
| 44CH | FRL | 10R | 19R | 9R | 2R | 0 | 3R | 37R | 0 |
| 44CH | FRH | 27R | 41R | 12R | 15R | 22R | 23R | 30R | 32R |
| 44CH | FCL | 6R | 4R | 2R | 0 | 4R | 0 | 5R | 0 |
| 44CH | FCH | 25R | 22R | 22R | 31R | 42R | 0 | 0 | 30R |
| 44CH | FLL | 18R | 12R | 38R | 51R | 28R | 13R | 17R | 44R |
| 44CH | FLH | 32R | 56R | 5R | 20R | 23R | 16R | 37R | 15R |

## DEVIATION SCORES--LATERAL

| SUB-JECT ID | CONDI-TION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 45CH | SRL | 0 | 9R | 0 | 0 | 0 | 0 | 0 | 0 |
| 45CH | SRH | 0 | 0 | 14R | 4R | 2R | 4R | 6R | 0 |
| 45CH | SCL | 10R | 0 | 0 | 6R | 0 | 0 | 0 | 0 |
| 45CH | SCH | 10R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 45CH | SLL | 4R | 0 | 0 | 7R | 3R | 0 | 9R | 18R |
| 45CH | SLH | 0 | 0 | 2R | 0 | 1R | 0 | 20R | 0 |
| 45CH | FRL | 8R | 17R | 6R | 0 | 6R | 5R | 2R | 4R |
| 45CH | FRH | 6R | 6R | 3R | 4R | 7R | 6R | 6R | 8R |
| 45CH | FCL | 13R | 18R | 3R | 7R | 8R | 4R | 3R | 3R |
| 45CH | FCH | 5R | 3R | 12R | 1R | 8R | 3R | 3R | 2R |
| 45CH | FLL | 0 | 2R | 9R | 0 | 10R | 9R | 2R | 2R |
| 45CH | FLH | 2R | 2R | 10R | 0 | 1R | 0 | 2R | 2R |
| 46CH | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10L |
| 46CL | SRH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 46CL | SCL | 4R | 0 | 7R | 2R | 0 | 1R | 0 | 0 |
| 46CL | SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 46CL | SLL | 6R | 27R | 9R | 10R | 4R | 16R | 8R | 0 |
| 46CL | SLH | 0 | 11R | 0 | 0 | 1R | 3R | 14R | 29R |
| 46CL | FRL | 1R | 2R | 0 | 2R | 2R | 1R | 8R | 0 |
| 46CL | FRH | 22R | 24R | 12R | 0 | 7R | 0 | 0 | 0 |
| 46CL | FCL | 31R | 0 | 32R | 11R | 16R | 0 | 0 | 19R |
| 46CL | FCH | 20R | 19R | 33R | 20R | 6R | 4R | 0 | 49R |
| 46CL | FLL | 0 | 0 | 0 | 8R | 0 | 19R | 21R | 19R |
| 46CL | FLH | 0 | 0 | 21R | 14R | 13R | 18R | 13R | 19R |
| 47CL | SRL | 1R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 47CL | SRH | 0 | 0 | 0 | 0 | 0 | 6R | 0 | 0 |
| 47CL | SCL | 6R | 0 | 0 | 3R | 4R | 2R | 4R | 2R |
| 47CL | SCH | 0 | 8R | 0 | 0 | 0 | 0 | 0 | 11R |
| 47CL | SLL | 10R | 1R | 5R | 3R | 3R | 27R | 11R | 20R |
| 47CL | SLH | 12R | 0 | 0 | 10R | 15R | 26R | 0 | 0 |
| 47CL | FRL | 15R | 15R | 0 | 0 | 0 | 0 | 0 | 0 |
| 47CL | FRH | 23R | 42R | 8R | 0 | 0 | 0 | 0 | 47R |
| 47CL | FCL | 0 | 0 | 28R | 17R | 22R | 27R | 20R | 0 |
| 47CL | FCH | 1R | 0 | 49R | 5R | 6R | 9R | 5R | 7R |
| 47CL | FLL | 0 | 0 | 0 | 0 | 0 | 12R | 0 | 21R |
| 47CL | FLH | 0 | 0 | 0 | 0 | 1R | 0 | 0 | 0 |
| 48CL | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 48CL | SRH | 0 | 0 | 1R | 0 | 3R | 0 | 0 | 0 |
| 48CL | SCL | 0 | 0 | 2R | 0 | 4R | 0 | 0 | 0 |
| 48CL | SCH | 0 | 0 | 6R | 0 | 4R | 0 | 8R | 1R |
| 48CL | SLL | 0 | 0 | 10R | 0 | 14R | 6R | 8R | 5R |
| 48CL | SLH | 0 | 11R | 7R | 31R | 8R | 7R | 11R | 9R |
| 48CL | FRL | 15R | 12R | 20R | 31R | 26R | 13R | 0 | 0 |
| 48CL | FRH | 11R | 20R | 18R | 3R | 0 | 0 | 16R | 0 |
| 48CL | FCL | 0 | 17R | 10R | 3R | 4R | 7R | 20R | 8R |
| 48CL | FCH | 0 | 36R | 20R | 18R | 19R | 30R | 25R | 14R |
| 48CL | FLL | 0 | 13R | 22R | 28R | 12R | 16R | 24R | 0 |
| 48CL | FLH | 0 | 0 | 5R | 0 | 11R | 0 | 7R | 0 |

## DEVIATION SCORES--LATERAL

| SUB-JECT ID | CONDI-TION | TRIALS 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 49CL | SRL | 0 | 0 | 9R | 7R | 0 | 9R | 6R | 3R |
| 49CL | SRH | 0 | 0 | 0 | 7R | 0 | 5R | 2R | 0 |
| 49CL | SCL | 0 | 0 | 15R | 0 | 0 | 0 | 0 | 0 |
| 49CL | SCH | 5R | 5R | 0 | 0 | 0 | 13R | 7R | 0 |
| 49CL | SLL | 12R | 14R | 4R | 17R | 16R | 5R | 12R | 10R |
| 49CL | SLH | 0 | 0 | 9R | 0 | 13R | 0 | 0 | 0 |
| 49CL | FRL | 10R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 49CL | FRH | 43R | 13R | 0 | 0 | 0 | 0 | 0 | 0 |
| 49CL | FCL | 19R | 0 | 50R | 0 | 0 | 4R | 2R | 0 |
| 49CL | FCH | 0 | 0 | 47R | 0 | 36R | 23R | 16R | 20R |
| 49CL | FLL | 0 | 16R | 24R | 21R | 24R | 17R | 19R | 21R |
| 49CL | FLH | 17R | 4R | 9R | 12R | 20R | 2R | 11R | 13R |
| 50CL | SRL | 0 | 1R | 9R | 0 | 0 | 12R | 6R | 0 |
| 50CL | SRH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 50CL | SCL | 4R | 0 | 2R | 0 | 2R | 0 | 0 | 0 |
| 50CL | SCH | 2R | 9R | 12R | 0 | 8R | 0 | 7R | 1R |
| 50CL | SLL | 0 | 0 | 2R | 0 | 0 | 0 | 10R | 11R |
| 50CL | SLH | 0 | 19R | 0 | 0 | 0 | 0 | 0 | 0 |
| 50CL | FRL | 3R | 8R | 8R | 10R | 9R | 33R | 0 | 0 |
| 50CL | FRH | 20R | 5R | 22R | 28R | 12R | 0 | 0 | 0 |
| 50CL | FCL | 26R | 13R | 0 | 2R | 46R | 23R | 0 | 0 |
| 50CL | FCH | 1R | 42R | 0 | 12R | 0 | 0 | 13R | 17R |
| 50CL | FLL | 0 | 0 | 21R | 7R | 37R | 16R | 20R | 28R |
| 50CL | FLH | 16R | 11R | 23R | 15R | 0 | 16R | 13R | 0 |
| 51CL | SRL | 0 | 0 | 3R | 0 | 0 | 0 | 0 | 0 |
| 51CL | SRH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 51CL | SCL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 51CL | SCH | 6R | 7R | 0 | 4R | 27R | 0 | 8R | 4R |
| 51CL | SLL | 9R | 37R | 12R | 41R | 27R | 24R | 16R | 21R |
| 51CL | SLH | 33R | 6R | 21R | 41R | 37R | 14R | 17R | 32R |
| 51CL | FRL | 24R | 28R | 0 | 0 | 0 | 0 | 15R | 0 |
| 51CL | FRH | 22R | 19R | 0 | 27R | 23R | 37R | 33R | 28R |
| 51CL | FCL | 4R | 69R | 15R | 0 | 0 | 4R | 0 | 10R |
| 51CL | FCH | 26R | 0 | 0 | 16R | 0 | 0 | 13R | 11R |
| 51CL | FLL | 0 | 4R | 22R | 18R | 8R | 15R | 11R | 11R |
| 51CL | FLH | 0 | 0 | 24R | 12R | 2R | 15R | 7R | 13R |
| 52CL | SRL | 0 | 2R | 0 | 0 | 0 | 0 | 0 | 0 |
| 52CL | SRH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 52CL | SCL | 17R | 18R | 0 | 3R | 0 | 0 | 0 | 0 |
| 52CL | SCH | 14R | 0 | 9R | 0 | 0 | 5R | 2R | 0 |
| 52CL | SLL | 15R | 14R | 11R | 17R | 10R | 9R | 13R | 6R |
| 52CL | SLH | 24R | 1R | 0 | 0 | 11R | 7R | 10R | 0 |
| 52CL | FRL | 19R | 19R | 28R | 0 | 0 | 1R | 6R | 0 |
| 52CL | FRH | 28R | 17R | 6R | 8R | 0 | 0 | 0 | 9R |
| 52CL | FCL | 44R | 33R | 28R | 0 | 31R | 28R | 34R | 26R |
| 52CL | FCH | 32R | 40R | 16R | 25R | 0 | 51R | 43R | 29R |
| 52CL | FLL | 0 | 0 | 0 | 1R | 0 | 0 | 0 | 0 |
| 52CL | FLH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# DEVIATION SCORES--LATERAL

| SUBJECT ID | CONDITION | TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 53CL | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 53CL | SRH | 3R | 15R | 2R | 0 | 0 | 0 | 0 | 0 |
| 53CL | SCL | 1R | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 53CL | SCH | 3R | 38R | 10R | 4R | 0 | 0 | 0 | 15R |
| 53CL | SLL | 0 | 0 | 6R | 18R | 0 | 3R | 0 | 10R |
| 53CL | SLH | 0 | 19R | 13R | 7R | 11R | 7R | 0 | 3R |
| 53CL | FRL | 19R | 5R | 9R | 10R | 12R | 14R | 13R | 0 |
| 53CL | FRH | 34R | 27R | 20R | 16R | 0 | 18R | 12R | 4R |
| 53CL | FCL | 0 | 28R | 16R | 9R | 14R | 12R | 18R | 10R |
| 53CL | FCH | 16R | 8R | 5R | 3R | 0 | 2R | 0 | 30R |
| 53CL | FLL | 0 | 2L | 0 | 1R | 0 | 7R | 10R | 12R |
| 53CL | FLH | 9R | 0 | 0 | 6R | 0 | 0 | 1R | 0 |
| 54CL | SRL | 0 | 0 | 0 | 0 | 0 | 0 | 11R | 9R |
| 54CL | SRH | 0 | 0 | 0 | 1R | 0 | 0 | 0 | 0 |
| 54CL | SCL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 54CL | SCH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 54CL | SLL | 10R | 14R | 9R | 6R | 21R | 13R | 0 | 18R |
| 54CL | SLH | 19R | 15R | 18R | 0 | 9R | 21R | 32R | 0 |
| 54CL | FRL | 10R | 0 | 0 | 45R | 0 | 16R | 0 | 0 |
| 54CL | FRH | 26R | 0 | 19R | 5R | 34R | 27R | 0 | 0 |
| 54CL | FCL | 33R | 16R | 11R | 4R | 2R | 1R | 3R | 0 |
| 54CL | FCH | 28R | 34R | 20R | 8R | 0 | 0 | 0 | 0 |
| 54CL | FLL | 0 | 0 | 0 | 0 | 20R | 9R | 5R | 6R |
| 54CL | FLH | 0 | 0 | 0 | 1R | 28R | 17R | 5R | 23R |

## RESULTS OF SCHEFFE'S MULTIPLE COMPARISON TESTS

## DISTANCE DEVIATION

| CONDITION | MEANS COMPARED | d | $d^2$ | A-VALUE | SIG. A-VALUE |
|---|---|---|---|---|---|
| HD | Lt Vs Ctr | 1,775.52 | 3,152,471.27 | 29,189.55* | 13,920.26 |
| | Lt Vs Rt | 108.00 | 11,664.00 | 108.00 | |
| | Ctr Vs Rt | 1,879.20 | 3,531,392.64 | 32,698.08* | |
| Sp X HD | SR Vs FR | 1,576.80 | 2,486,298.24 | 23,021.28 | 45,488.098 |
| | SL Vs FL | 2,764.80 | 7,644,119.04 | 70,778.88* | |
| | SC Vs FC | 1,205.28 | 1,452,699.88 | 13,450.92 | |
| Sp X VD | SH Vs SL | 10,445.76 | 109,113,901.98 | 1,010,313.39* | 74,531.25 |
| | FH Vs FL | 5,425.92 | 29,440,607.85 | 272,598.22* | |
| | SH Vs FL | 2,505.60 | 6,278,031.36 | 58,129.92 | |
| | SL Vs FH | 2,514.24 | 6,321,402.78 | 58,531.51 | |
| VD X HD | LR Vs LC | 423.36 | 179,233.69 | 1,659.57 | 31,249.99 |
| | LR Vs LL | 555.20 | 2,418,647.04 | 22,394.88 | |
| | LC Vs LL | 1,131.84 | 1,281,061.79 | 11,861.68 | |
| | HR Vs HC | 3,330.72 | 11,093,695.72 | 102,719.40* | |
| | HR Vs HL | 1,334.88 | 1,781,904.61 | 16,499.12 | |
| | HC Vs HL | 4,665.60 | 21,767,823.36 | 201,553.92* | |
| Age X Sp X VD | JFL Vs HFL | 523.38 | 273,926.62 | 7,609.07 | 193,083.28 |
| | JFL Vs CFH | 306.02 | 93,648.24 | 2,601.34 | |
| | HFL Vs CFH | 217.36 | 47,245.37 | 1,312.37 | |
| | JFH Vs HFH | 491.92 | 241,985.29 | 6,721.81 | |
| | JFH Vs CFH | 1,615.90 | 2,611,132.81 | 72,531.46 | |
| | HFH Vs CFH | 1,123.98 | 1,263,331.04 | 35,092.53 | |
| | JSH Vs HSH | 1,688.83 | 2,852,146.77 | 79,226.30 | |
| | JSH Vs CSH | 644.93 | 415,934.70 | 11,553.74 | |
| | HSH Vs CSH | 1,043.90 | 1,089,727.21 | 30,270.20 | |
| | JSL Vs HSL | 1,837.55 | 3,376,590.00 | 93,794.17 | |
| | JSL Vs CSL | 793.83 | 948,344.87 | 26,342.91 | |
| | HSL Vs CSL | 2,811.38 | 7,903,857.50 | 219,551.597* | |

## DISTANCE DEVIATION (CONT'D)

| CONDITION | MEANS COMPARED | d | $d^2$ | A-VALUE | SIG. A-VALUE |
|---|---|---|---|---|---|
| Sk X Sp X VD | HFH Vs HFL | 876.96 | 769,058.84 | 14,241.83 | 173,906.26 |
| | LFH Vs LFL | 9,966.25 | 99,326,139.06 | 1,839,372.95* | |
| | HSH Vs HSL | 7,607.52 | 57,874,360.55 | 1,071,747.42* | |
| | LSH Vs | 13,284.00 | 176,464,656.00 | 3,267,864.00* | |

## LATERAL DEVIATION

| CONDITION | MEANS COMPARED | d | $d^2$ | A-VALUE | Sig. A-VALUE |
|---|---|---|---|---|---|
| HD | Lt Vs Rt | 1,680.48 | 2,824,013.03 | 26,148.27* | 4,136.1384 |
| | Lt Vs Ctr | 1,425.60 | 2,032,335.36 | 18,817.92* | |
| | Ctr Vs Rt | 254.88 | 64,963.81 | 601.52 | |
| Age X HD | JR Vs HR | 103.68 | 10,749.54 | 298.60 | 9,233.37 |
| | JR Vs CR | 1,438.56 | 2,069,454.87 | 57,484.86* | |
| | HR Vs CR | 1,334.88 | 1,781,904.61 | 49,497.35* | |
| | JC Vs HC | 324.00 | 104,976.00 | 2,916.00 | |
| | JC Vs CC | 725.76 | 526,727.58 | 14,631.32* | |
| | HC Vs CC | 410.40 | 168,428.16 | 4,678.56 | |
| | JL Vs HL | 1,948.32 | 3,795,950.82 | 105,443.08* | |
| | JL Vs CL | 3,607.20 | 13,011,891.84 | 361,441.44* | |
| | HL Vs CL | 1,658.88 | 2,751,882.85 | 76,441.19* | |
| Sp X HD | FR Vs FC | 1,529.28 | 2,338,697.32 | 21,654.60* | 4,555.36 |
| | FR Vs FL | 4,579.20 | 20,969,072.64 | 194,158.08* | |
| | FC Vs FL | 3,049.92 | 9,302,012.01 | 86,129.74* | |
| | SR Vs SC | 1,019.52 | 1,039,421.03 | 9,624.27* | |
| | SR Vs SL | 1,218.24 | 1,484,108.70 | 13,741.75* | |
| | SC Vs SL | 198.72 | 39,489.64 | 365.64 | |
| | FR Vs SR | 60.48 | 3,657.83 | 33.87 | |
| Sp X VD | FH Vs FL | 1,288.98 | 1,661,469.44 | 15,383.98* | 1,338.67 |
| | SH Vs SL | 64.80 | 4,199.04 | 38.88 | |
| VD X HD | HR Vs HC | 51.84 | 2,687.39 | 24.88 | 1,961.92 |
| | HR Vs HL | 272.16 | 74,071.07 | 685.84 | |
| | HC Vs HL | 324.00 | 104,976.00 | 972.00 | |
| | LR Vs LC | 565.92 | 320,265.45 | 2,965.42* | |
| | LR Vs LL | 3,088.80 | 9,540,685.44 | 88,339.68* | |
| | LC Vs LL | 2,522.88 | 6,364,923.49 | 58,934.48* | |

## RADIAL ERROR

| CONDITION | MEANS COMPARED | d | $d^2$ | A-VALUE | SIG. A-VALUE |
|---|---|---|---|---|---|
| HD | Lt Vs Ctr | 2,436.48 | 5,936,434.79 | 54,966.99* | 16,983.37 |
| | Lt Vs Rt | 846.72 | 716,934.76 | 6,638.28 | |
| | Ctr Vs Rt | 1,589.76 | 2,527,336.86 | 23,401.28* | |
| Sp X HD | SR Vs FR | 1,150.20 | 1,322,960.04 | 12,249.63 | 45,188.96 |
| | SL Vs FL | 4,409.64 | 19,444,924.93 | 180,045.60* | |
| | SC Vs FC | 217.08 | 47,123.73 | 436.33 | |
| Sp X VD | SH Vs SL | 7,315.96 | 53,522,685.45 | 495,580.42* | 50,756.09 |
| | FH Vs FL | 3,171.96 | 10,061,330.24 | 93,160.47* | |
| | SH Vs FH | 6,402.24 | 40,988,677.02 | 379,524.79* | |
| | SL Vs FL | 4,085.64 | 16,692,454.21 | 154,559.76* | |
| HD X VD | LR Vs LC | 392.04 | 153,695.36 | 1,423.11 | 74,522.19 |
| | LR Vs LL | 511.92 | 262,062.09 | 2,426.50 | |
| | LC Vs LL | 119.88 | 14,371.21 | 133.07 | |
| | HR Vs HC | 4,354.56 | 18,962,192.79 | 175,575.86* | |
| | HR Vs HL | 1,015.20 | 1,030,631.04 | 9,542.88 | |
| | HC Vs HL | 3,339.36 | 11,151,325.21 | 103,253.01* | |
| Sk X Sp X VD | HSH Vs HSL | 3,501.36 | 12,259,521.85 | 227,028.18* | 201,781.53 |
| | LSH Vs LSL | 6,253.20 | 39,102,510.24 | 724,120.56* | |
| | HFH Vs HFL | 123.12 | 15,158.53 | 280.71 | |
| | LFH Vs LFL | 4,104.00 | 16,842,816.00 | 311,904.00* | |

## REACTION TIME

| CONDITION | MEANS COMPARED | d | $d^2$ | A-VALUE | SIG. A-Value |
|---|---|---|---|---|---|
| HD | Lt Vs Ctr | 22.032 | 485.41 | 4.49* | 3.2289 |
| | Lt Vs Rt | 55.196 | 3,046.60 | 28.21* | |
| | Ctr Vs Rt | 33.264 | 1,106.49 | 10.25* | |

## MOVEMENT TIME

| CONDITION | MEANS COMPARED | d | $d^2$ | A-VALUE | SIG. A-VALUE |
|---|---|---|---|---|---|
| HD | Lt Vs Ctr | 3.024 | 9.14 | .085 | 3.039 |
| | Lt Vs Rt | 57.456 | 3,301.19 | 30.57* | |
| | Ctr Vs Rt | 54.432 | 2,962.84 | 27.43* | |